THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

MARCH
1954

Sand and gravel plant of
Rhodes & Jamieson, Ltd., near Centerville, Calif.

CRUSH POWER-SHOVEL-LOADED ROCK TO SIZES DOWN TO 3/4" IN ONE OPERATION!

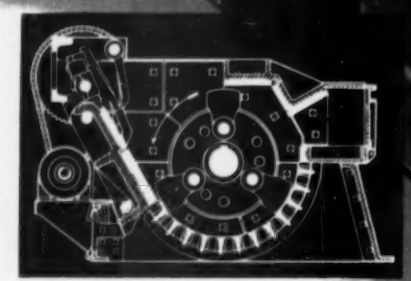
WILLIAMS SUPER SLUGGER

... CUT CRUSHING COSTS AS MUCH AS 50%!
... REDUCE INVESTMENT AS MUCH AS 75%!

A Hammer Mill as powerful, big and rugged as they come! Takes stone as large as 2½ yard dipper can handle and crushes it with power-packed hammer blows to 2", 1¼" or ¾"—even down to feed size for fine grinding—in a single operation! Capacities range up to 550 tons per hour.

One Super-Slugger will actually do the work of an ordinary primary crusher plus several secondary reduction machines—do it faster and better—and far more economically! All expense of extra foundations, housing, conveyors or elevators, and drives, is entirely eliminated. Power requirements are much less. Exceptionally large shafts, extra heavy manganese steel liners and breaker plates, shock and wear-resistant reinforcing—all reduce upkeep and downtime, depreciation and wear to absolute minimums.

If you're in business for PROFIT, you can't afford NOT to know what the Super-Slugger can do for you!



Cross section of Super-Slugger equipped with "Pusher Feeder" non-clog device for maximum feeding of sticky or wet materials through crusher.

OTHER WILLIAMS EQUIPMENT

HAMMER MILLS in many types and sizes for any requirement . . . ROLLER and IMPACT MILLS for fine grinding to any mesh, even to micron sizes . . . HELIX-SEAL HAMMER MILLS for dust-free grinding and for wet, sticky, greasy materials . . . DRYER MILLS for grinding wet materials down to 400 mesh . . . AIR SEPARATORS . . . VIBRATING SCREENS . . . COMPLETE PLANTS for crushing and grinding.

Write For Brochure

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 ST. LOUIS AVE. St. Louis 6, Mo.

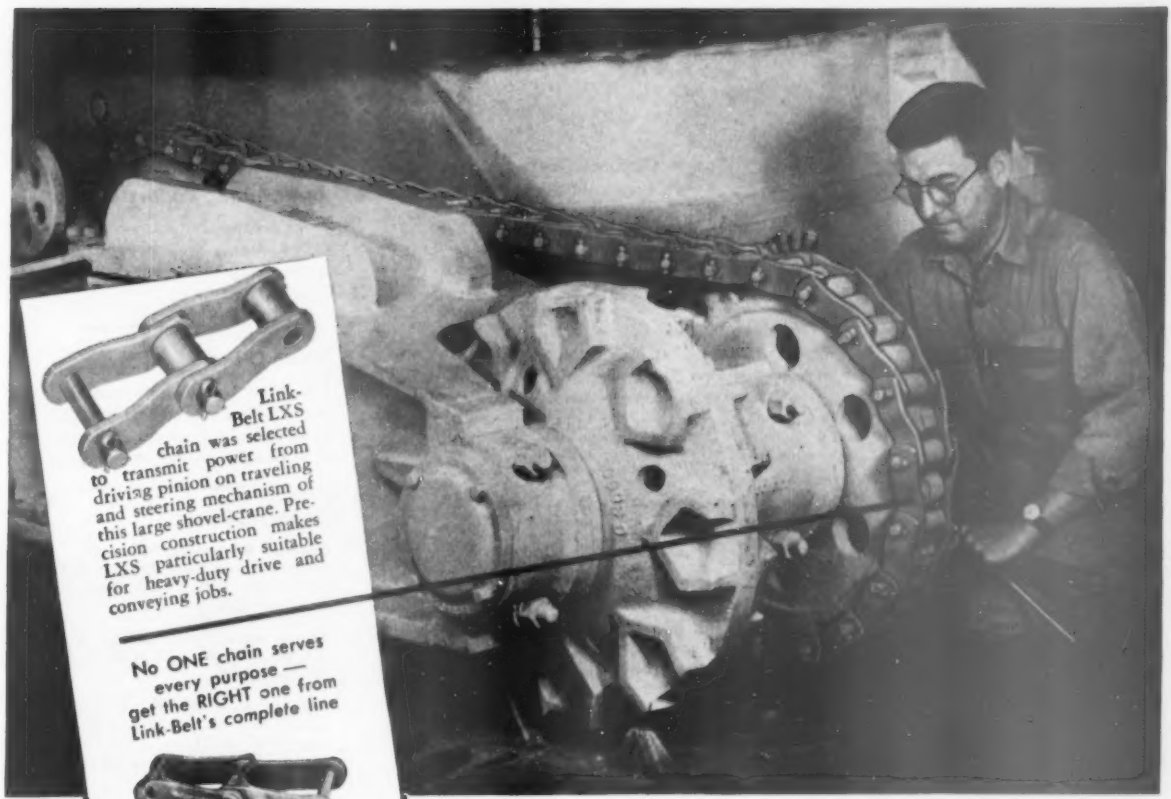
WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

For long chain life under severe drive or conveyor service...it's

LINK-BELT LXS



Link-Belt LXS chain was selected to transmit power from driving pinion on traveling and steering mechanism of this large shovel-crane. Precision construction makes LXS particularly suitable for heavy-duty drive and conveying jobs.

No ONE chain serves every purpose — get the RIGHT one from Link-Belt's complete line

Class 800 ley bushed chain—for heavy duty, abrasive conveying and elevating.

Class C combination chain—popular, durable, low cost design for elevators, conveyors.

Class H drag chain—for drag conveyors, handling material in runways or troughs.

Link-Belt "Flint-Rim" cast sprockets give extra long life. Cast steel sprockets for most severe service.

LINK-BELT offers the chain that's best for every job

Here's a fabricated steel roller chain that outlasts, outperforms ordinary chain where the going is tough. Accurate sizing of full-round pins, bushings and pitch holes assures users of Link-Belt LXS chain closer joint fit . . . better wear resistance.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw material specifications and manufacturing processes results in uniformity . . . longer chain life.

For all the facts on LXS chain, and for information on the complete line of Link-Belt chains and sprockets, see the Link-Belt sales representative or distributor nearest you.

LINK-BELT

CHAINS & SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Offices: New York 7; Canada, Scarboro (Toronto 13); Australia, Sydney; South Africa, Springs. Representatives Throughout the World. 13.283-A

ROCK PRODUCTS

MARCH, 1954 — THE INDUSTRY'S RECOGNIZED AUTHORITY — VOL. 57, No. 3

Bror Nordberg
Editor

Nathan C. Rockwood
Editorial Consultant

This Month

We Hear 41

Editorial—The Pattern for Business in 1954 53

Rocky's Notes—Volume Changes in Frozen Cement Paste 55

Labor Relations Trends 57

People in the News 59

Industry News 63

Hints and Helps 66

New Machinery 68

Calaveras Increases Capacity Again 70
Improvement program of Calaveras Cement Co., for cement plant at San Andreas, Calif., includes addition of a fourth kiln and two raw grinding mills.
Walter B. Lenhart

How Does Material Flow from a Bin? 73
Studies of bin flow have developed equations for the engineer which are expected to simplify design and specifications for bins, feeders or conveyors.
John K. Rudd

Competition for Business Reflected in Sand and Gravel Program 75
National conventions of sand and gravel and ready mixed concrete industries draw attendance of over 4800. Quality, service and merchandising emphasized in reports and discussions

Theory and Practice of Lime Manufacture 89
Part VIII. Simplified procedure of kiln performance evaluation by means of exhaust gas analysis
Victor J. Azbe

Pennsylvania Producers Hold Joint Meetings 91

Producing Lightweight Aggregate from Slate 92
Two-kiln plant of Georgia Lightweight Aggregate Co., is mechanized throughout for high efficiency and economy. Dust collector followed by spray tower hold dust to a minimum.

Concrete Durability of German Autobahnen Highways 108
Studies of cements and aggregates, method of mixing and placing concrete reveal practices and materials which have given most satisfactory service
Otto Graf

CONCRETE PRODUCTS—

Convention Presents Plans to Promote Acceptance of Concrete Masonry 161
National Concrete Masonry Association convention in Washington, D. C. learns about new research and advertising program to expand markets

New Machinery 167

Booming Ready Mix Industry Establishes All-Time Attendance Record 163
National Ready Mixed Concrete Association discusses ways and means of maintaining sales volume

Concrete Engineering Troubles 174
18. A producer views the ready-mixed concrete business
Jos. A. Nicholson

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Contributing Editors

Victor J. Azbe
F. O. Anderegg
M. W. Leving
James A. Barr, Jr.

Home Office

P. D. Allen, General Manager
Mary A. Whalen, Subscription Dir.
C. M. Hancock, Production Manager
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District Offices

Eastern Area—Reginald W. Davis, Manager; Chas. Daly, Assistant, 522 Fifth Ave., New York 36, Tel. Murray Hill 2-7888.

Central Area—R. E. Keine, Manager, Hanna Bldg., Cleveland 15, Tel. Main 1-4362.

Midwest Area—E. H. Hickey, Manager, 309 W. Jackson Blvd., Chicago 6, Tel. Harrison 7-7890. Donald C. White, representative.

Western Area—L. C. Thaon, Manager, 309 West Jackson Blvd., Chicago 6, Tel. Harrison 7-7890.

Pacific Area—Duncan Scott & Co., Mills Bldg., San Francisco 4, Tel. Garfield 1-7950. In Los Angeles 5, 2978 Wilshire Blvd., Tel. Dunkirk 8-4151.

London, England—Harold F. Charles, Managing Director, Maclean-Hunter, Ltd., Wellington House, 125 Strand, London, W. C. 2.

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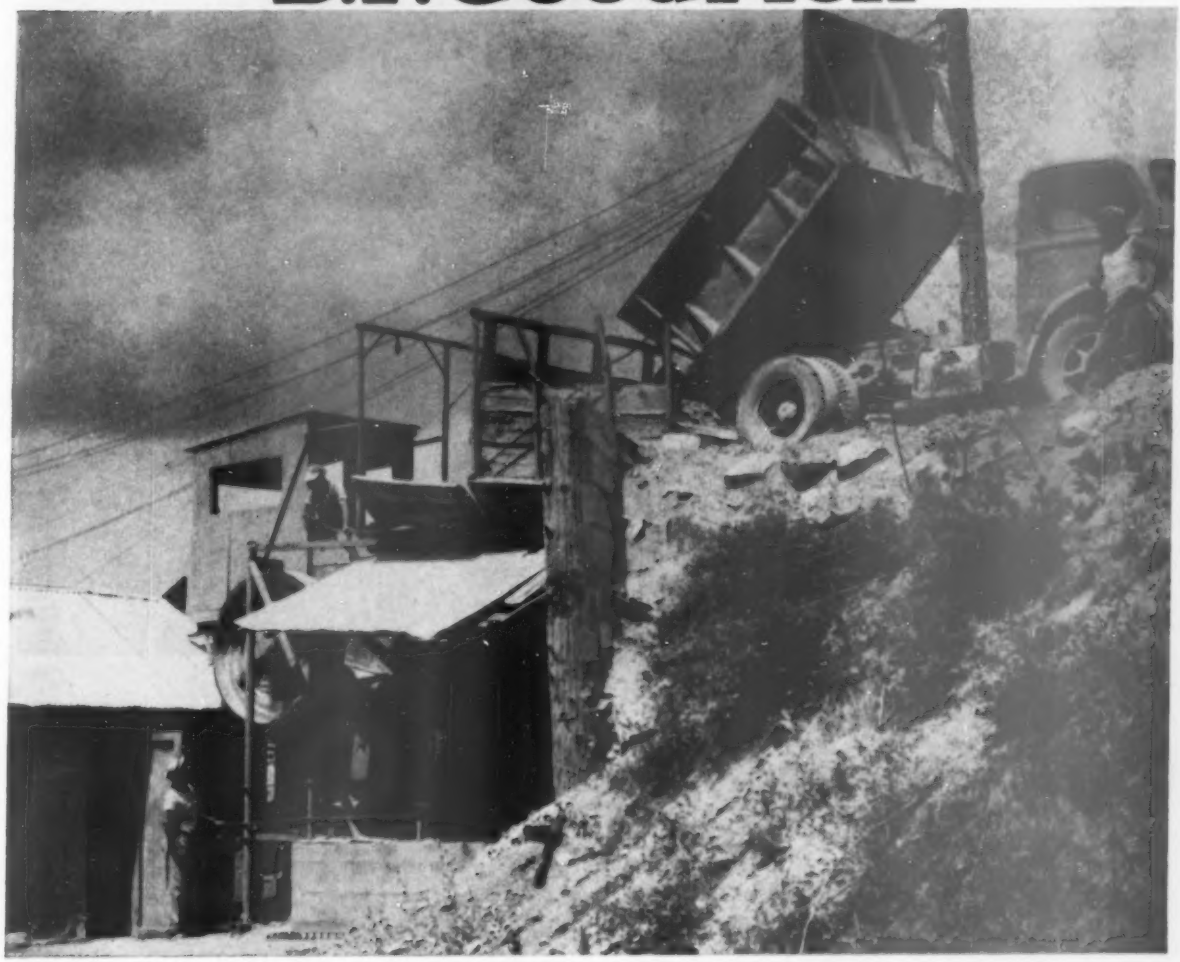
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Again! Longer life, greater savings with Grommet V belts

Rock company saves 3 ways with B. F. Goodrich V belts

ROCKS by the truckload are dumped in that crusher, and reduced to the right size for highway construction. But the jolting action is rough on the V belts that run the crusher. Ordinary belts suffered from shock loads, wore out fast. Time outs for belt replacements brought the whole plant to a standstill.

When the company told a B. F. Goodrich man about the trouble, he recommended a switch to Grommet V belts. The belts you see here had been at work three years when the picture was taken without any shutdowns whatever for maintenance.

No wonder B. F. Goodrich Grommet belts outlast and outperform ordinary belts. In Grommet belts, all the load-carrying cords are concentrated in twin grommets. These grommets are cord loops made like giant twisted cables except that they're endless. Since there are no center cords, the Grommet belt is more flexible, and so can "give" temporarily and absorb shock loads. As a result, Grommet belts last 20 to 50% longer, depending on the service.

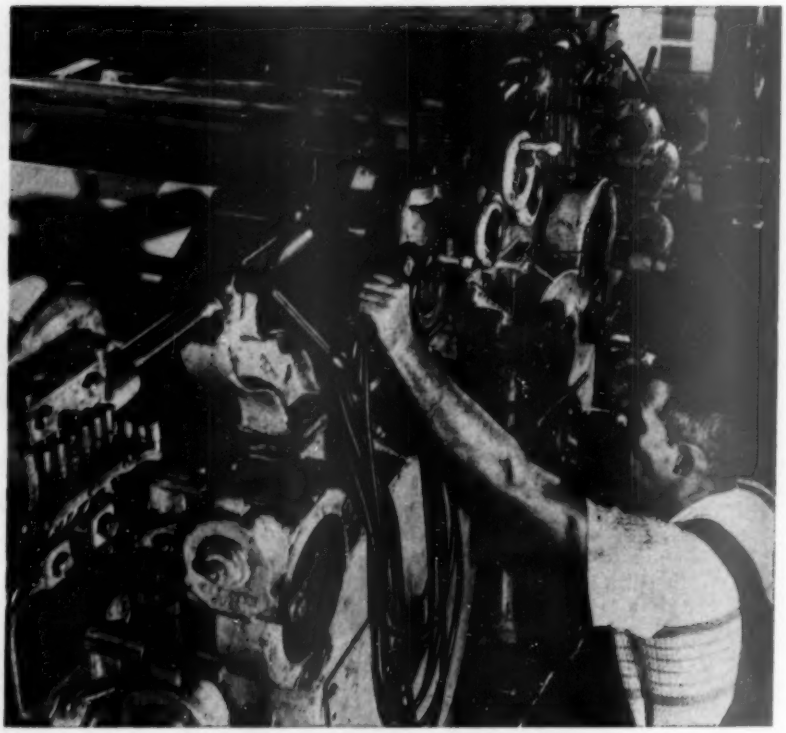
This company, like many others, is making a 3-way saving with Grommet V belts. First, they save on replacement costs because Grommet belts last longer. They save on production costs with no shutdowns caused by belt failures. And they save on maintenance costs because these belts need less attention. Yet the savings they make are clear profit because Grommet belts cost not one cent more than ordinary V belts. Next time you need V belts, order Grommet V belts from your BFG distributor. Or write *The B. F. Goodrich Company, Dept. M-202, Akron 18, Ohio.*

Grommet—T.M. The B.F.Goodrich Co.

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

No. 3 of a series

How Bemis makes GOOD multiwall bags for you



As with other types of printing, there is no substitute for experience in multiwall paper bag printing. A typical Bemis pressman is Wesley Pitcher, shown here at the 4-color press he operates at the Bemis plant in Peoria. Wesley went to work in the printing department 21 years ago and has been a pressman for 18 years.

Good bag printing requires *three* things . . . and Bemis has 'em!

Good multiwall bag printing . . . the kind that makes your brand a star salesman . . . requires good presses, good plates and good workmen. *And Bemis has 'em!*

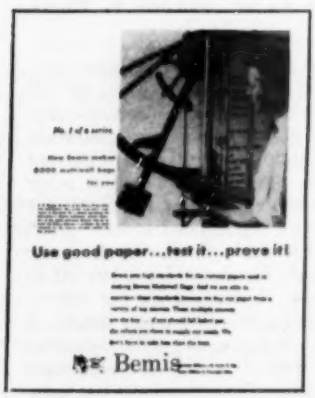
1. Specially designed presses . . . with features needed for *best multiwall printing* . . . are used.

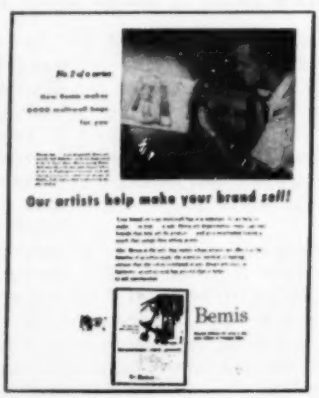
2. Our own skilled, experienced plate makers make our printing plates . . . so we control quality every inch of the way.

3. Since we have been making and printing quality multiwalls for twenty-seven years, we have trained our pressmen to the point that they do, day in and day out, the best printing in the bag industry.

Bemis

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities





Making the pit jobs EASIER!

Sure, equipment isn't everything. Other factors can affect the gravel producing business, but pit equipment is a large part of the factory of the sand and gravel business. Put the shovel "down" and there isn't much for the crushing or washing plant to turn out.

Rosenfeld Washed Sand & Stone Co. have grown steadily—for quite a few years with Northwest! They now operate their 5th Northwest Machine! Their growth proves they are successful operators and they know equi[illegible]

Northwest brings you a combination of design and proved advantages that mean more output and lower cost maintenance. One out of every three Northwests is a repeat order from a satisfied customer. That means more than reams of words. Learn about Northwest advantages now and plan to join the Northwest Crowd.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street, Chicago 3, Illinois

FIVE NORTHWESTS for ROSENFELD WASHED SAND & STONE CO. Milford, Mass.

NORTHWEST

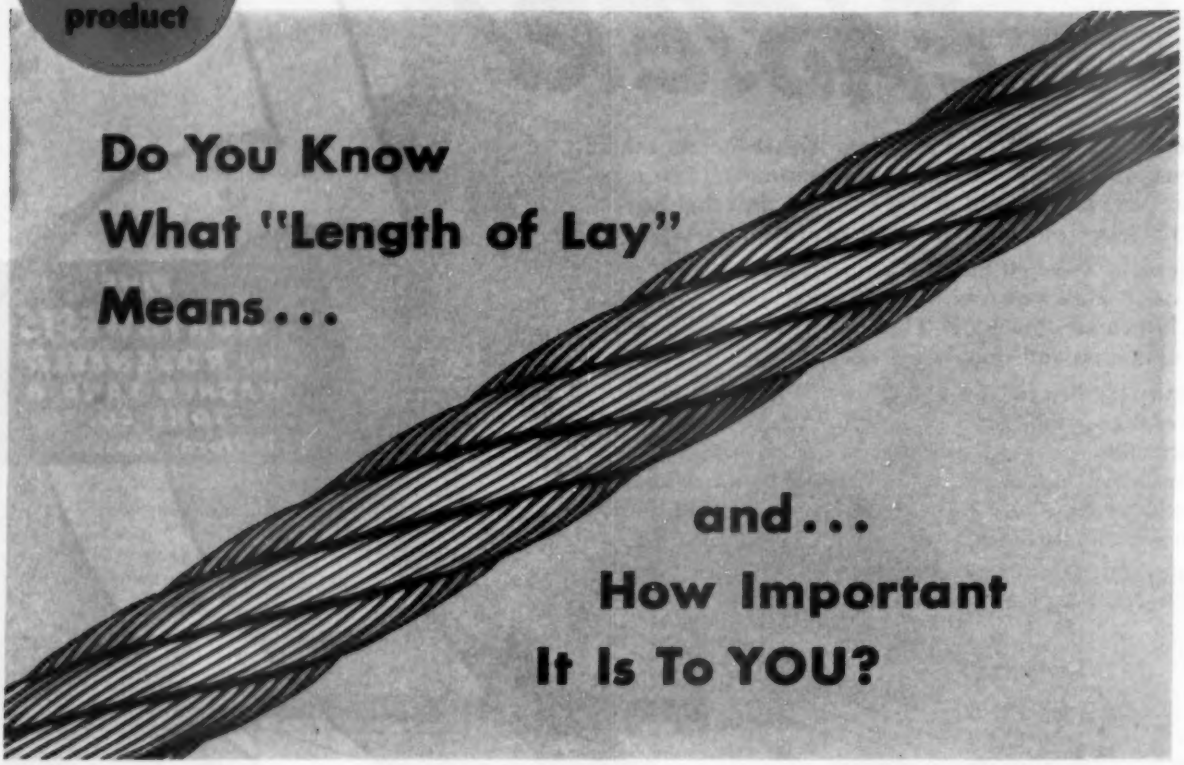
SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Convertible for any Mining Material Handling or Excavation Problem

an ACCO product

AMERICAN CABLE

"GREEN STRAND" WIRE ROPE



Length of lay is the distance allowed for a strand to make one complete turn around the wire rope. This distance varies depending upon the construction and diameter of the rope, and upon the service requirements. The service factors which must be considered are elasticity, flexibility, stability, resistance to abrasion, and strength.

Elasticity is desired in order that a wire rope may absorb the application of loads gradually and not with sudden shock. The shorter the lay, the more elasticity in the rope. The reverse is also true.

Flexibility is that quality which a rope possesses which permits it to be flexed or bent around sheaves and drums. This property is desired from a standpoint of fatigue resistance of wires in a rope when subjected to bending stresses. An increase in length of rope lay tends to make the rope less flexible. This does not necessarily mean that a rope with a longer lay would also have less resistance to bending fatigue with which the term flexibility is often confused.

Stability of construction can be described best by observing the result of twisting the ends of a towel in opposite directions. You will find that the structure becomes harder with the increase in the amount of twisting. It will resist distortion when outside compressive force is applied. The same is true in a strand or in a finished rope. In effect, the shorter the lay the more it will resist crushing.

Abrasion resistance would seem to require more and larger crown wires per foot exposed to wear. Shortening the lay exposes more crown wires and makes the rope more flexible so larger diameter wires can be used. Then it becomes a matter for our engineers to set the length of lay to provide abrasion resistance but not at the expense of the other factors.

Strength of a wire rope is definitely influenced by the length of its rope lay. Of two ropes, identical except for their rope lay, the one with the longer lay will be stronger. Although the shortening of lays tends towards certain desirable conditions, a critical point is always reached beyond which the lay cannot be shortened without making the rope stiff.

If all this sounds mighty complicated, forget it. We don't expect you to become a wire rope engineer. That's our job—to engineer and make the best possible wire rope for you. In our "Wire Rope Recommendations for General Contractors" you will find the correct constructions of TRU-LAY Preformed "Green Strand" for your equipment. See your American Cable distributor or write us for a copy of **No. 128-B.**

ACCO

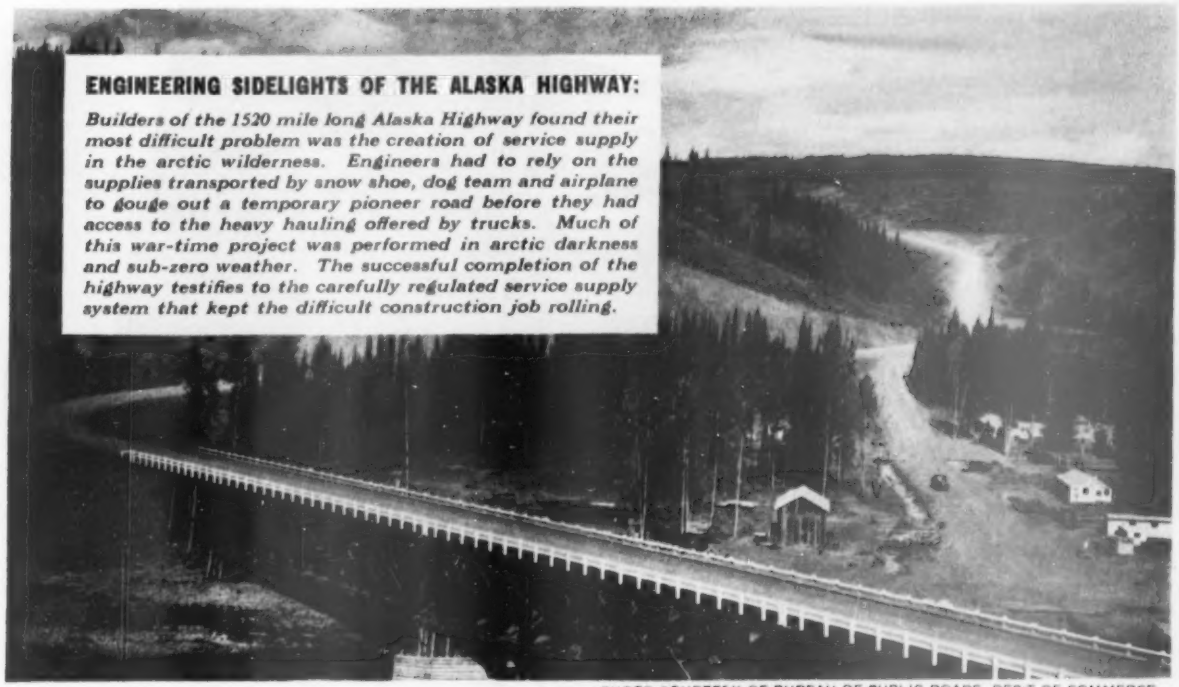
American Cable Division

AMERICAN CHAIN & CABLE

TRADE MARK

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

plus ACCO Registered Wire Rope Slings



ENGINEERING SIDELIGHTS OF THE ALASKA HIGHWAY:

Builders of the 1520 mile long Alaska Highway found their most difficult problem was the creation of service supply in the arctic wilderness. Engineers had to rely on the supplies transported by snow shoe, dog team and airplane to gouge out a temporary pioneer road before they had access to the heavy hauling offered by trucks. Much of this war-time project was performed in arctic darkness and sub-zero weather. The successful completion of the highway testifies to the carefully regulated service supply system that kept the difficult construction job rolling.

PHOTO COURTESY OF BUREAU OF PUBLIC ROADS, DEP T OF COMMERCE

Traylor Apron Feeders Regulate Material Flow to Keep Production Rolling

Built in widths of 30" to 84" to any reasonable length.

Traylor

A Traylor Apron Feeder assures a steady, even flow of material from hopper to crusher. A Traylor feeder maintains crusher production at its most efficient and economical rate. In fact, a Traylor Feeder will practically double the output of your present aggregate plant by eliminating the peaks and valleys that result from feeding directly into the crusher. Traylor Apron Feeders also lower maintenance costs throughout the entire aggregate plant by eliminating shock loads and dry runs of crushers and allied equipment. Bulletin 1114 shows how controlled feeding can boost the efficiency of your plant. Send for your free copy today.

TRAYLOR ENGINEERING & MFG., CO.
625 MILL ST., ALLENTOWN, PA.
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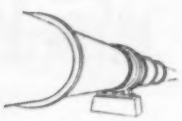
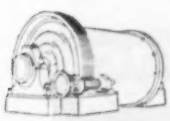
Primary Gyratory Crushers



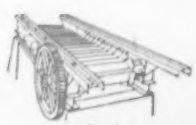
Rotary Kilns

Secondary Gyratory Crushers



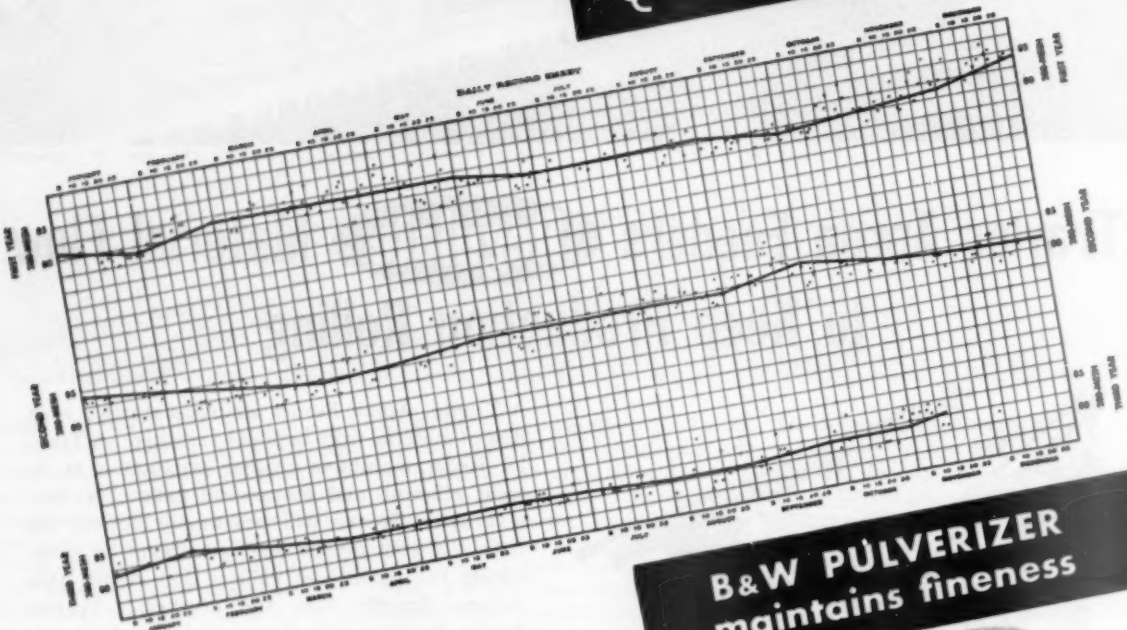
Ball Mills

Jaw Crushers



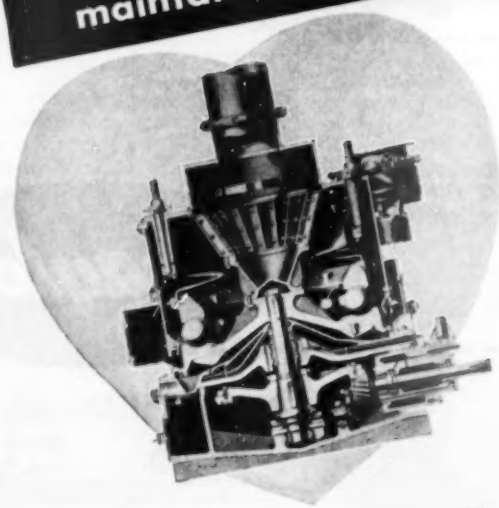
Apron Feeders

QUALITY CONTROL



B&W PULVERIZER maintains fineness

Chart shows record of a B&W Type E Pulverizer over a three-year period. The Babcock & Wilcox Company, Boiler Division, Process Equipment Department, 161 East 42nd Street, New York 17, N. Y.



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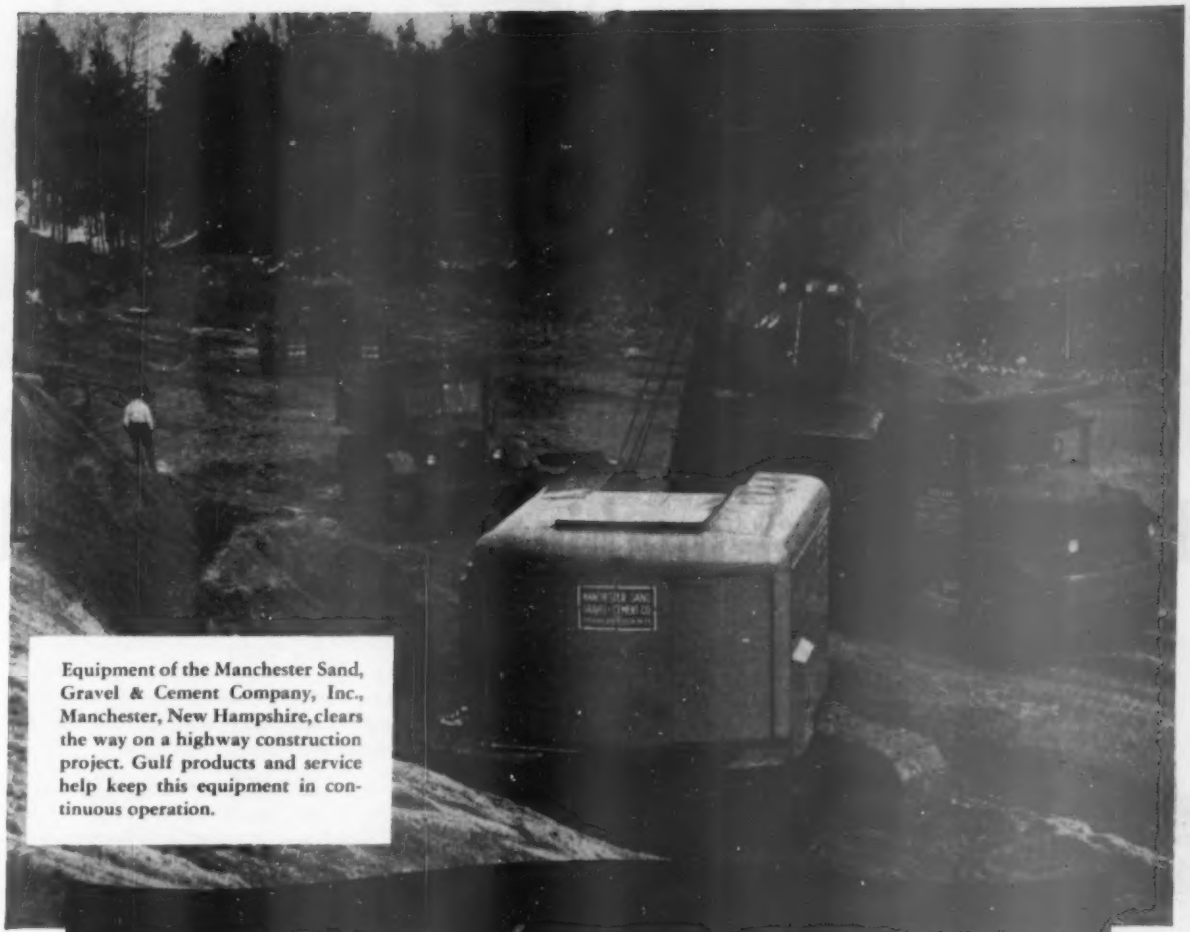


Equipment of the Manchester Sand, Gravel & Cement Company, Inc., Manchester, New Hampshire, clears the way on a highway construction project. Gulf products and service help keep this equipment in continuous operation.

MORE HAULS / FEWER OVERHAULS

with Gulf Quality Lubricants and Fuels

at Manchester Sand, Gravel & Cement Co., Inc.

Whatever your operation — whether it's quarrying, crushing, processing, or hauling; and under any operating conditions—hot or cold, wet or dry—Gulf lubricants and fuels, plus Gulf's prompt delivery service, will help assure you smoother performance of equipment and lower maintenance costs.

Gulf lubricants give that extra margin of protection against wear. And Gulf fuels burn evenly and completely, with fewer engine deposits.

For more hauls — fewer overhauls, try Gulf quality products and fine, friendly service. Call your nearest Gulf office today.

GULF

Gulf Oil Corporation
Gulf Refining Company
1822 Gulf Building
Pittsburgh 30, Pa.

"By far the best machine we've ever used"

As needed, Tournatractor moves onto tracks to position rail cars. Tires prevent damage to ties and tracks.

Ahead of schedule at clamshell, Tournatractor strips timberland for development of gravel pit.

Tournatractor—Trademark T-379-S-b

American Sand & Gravel Co., Hattiesburg, Mississippi, use their 186 hp Tournatractor for a variety of tasks at their Glendale pit. Its chief job is to doze filler sand 25 to 200′ to within reach of a clamshell which loads trucks and railroad cars for delivery to road jobs around the state.

While production depends on demand for material, Tournatractor dozes an average of 172 yds. hourly on 50 to 400′ cycles. Moving from 2 to 2½ yds. per pass, it brings in enough material for 47 railroad cars . . . or about 1720 yds. of sand per 10-hour day! In 1000 hours, Tournatractor and dragline have accounted for 4500 carloads (225,000 tons) according to Manager A. G. Collins. That's about 4 times the output possible with a 76 hp crawler doing the dozing, says Collins.

Easily handling normal feeding needs by itself, versatile Tournatractor uses its 19 mph speed on rubber to good advantage on scattered odd jobs, too. In spare time, unit has leveled 14,000 yds. for a truck road and railroad spur line, and has stripped 8 acres of timberland for development of a gravel pit.

Owner reports Tournatractor 90% mechanically efficient for 2900 hours. Tournatractor has eliminated all track maintenance, and has required only a few minor repairs in 1½ years of steady use. Tire wear has been *excellent* despite the abrasive material.

Says Supt. H. E. Golden, "For this job, Tournatractor is by far the best machine we have ever used. Its speed is an important factor in keeping our operation running smooth."

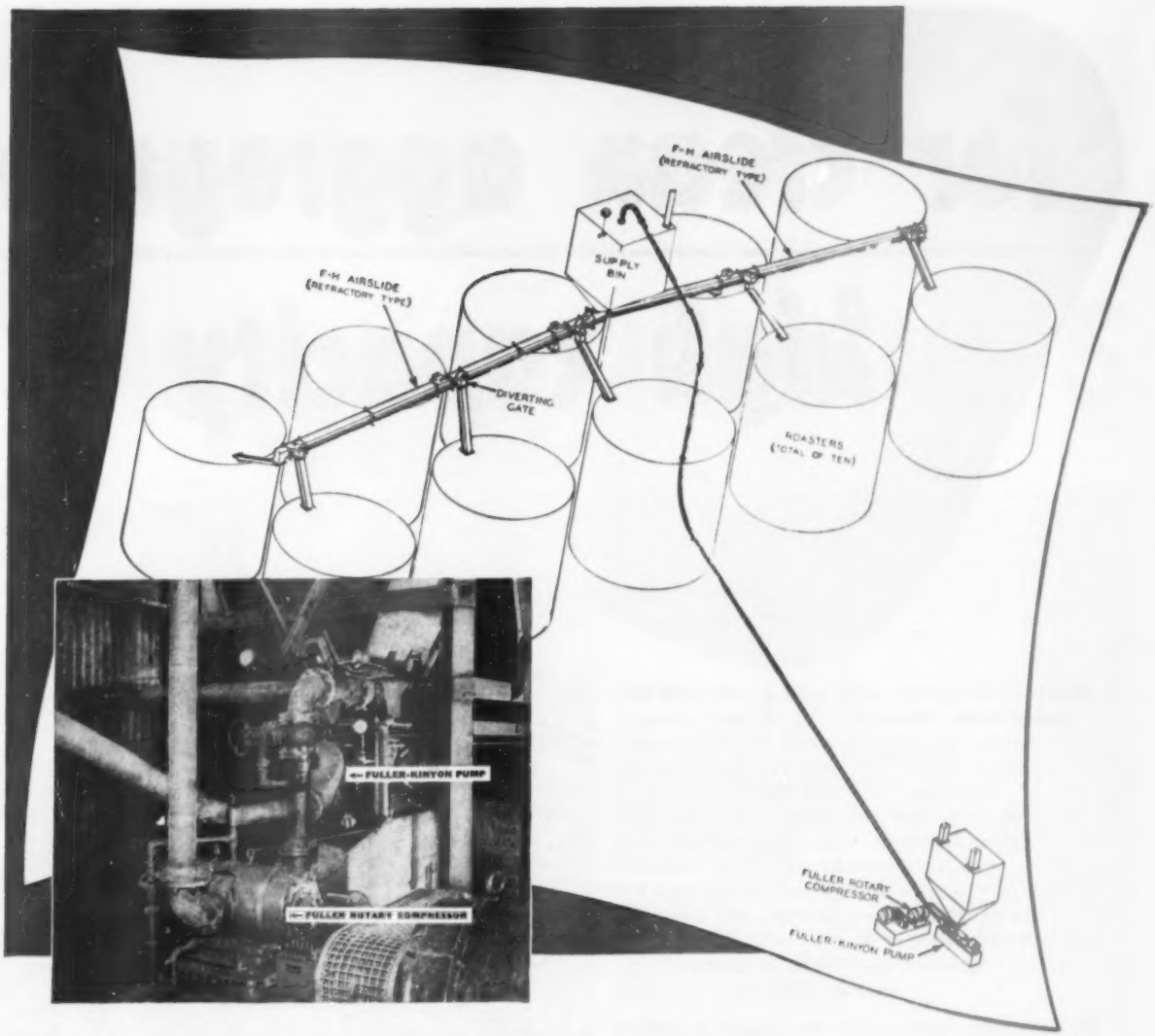
Adds Operator Pat Riels, "I like the operating features of Tournatractor. You can put in a full day's work and still feel good at the end of the day. Besides, you don't spend half your time waiting around between jobs."

Find out for yourself how Tournatractor's mobility and 19 mph speed can get more work done for you at lowest-net-cost. Ask for a demonstration on *your* job. There's no obligation.

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company



Conveying "Hot Stuff" at Noranda Mines---with Fuller-Kinyon Pump and F-H Airslides

Problem: To convey hot flue dust from Cottrell precipitator collecting hoppers, and distribute uniformly to ten roasters, without dust or loss.

Solution: After long and careful study by both Noranda and Fuller engineers, it was decided to install a Fuller-Kinyon Conveying System as the most practical and efficient method of conveying from the precipitator to a supply bin. A Fuller-Kinyon Pump, with water-cooled seal, handles this flue dust at temperatures up to 800 deg. fahr., at rate of 25 tons an hour, in a highly satisfactory manner, through a conveying line of approximately 220 feet. From the supply bin, F-H Airslides, of the refractory type, convey and distribute the material to the roasters, with no dust or loss.

A Fuller Rotary Single-stage Compressor furnishes approximately 478 c.f.m. of air at 15-lb. pressure, to the Fuller-Kinyon Pump, through a direct-connected air line.

When your problem is conveying dry, pulverized materials, why not have a Fuller engineer make a study of your requirements. His findings may result in savings you never anticipated or thought possible. Write us today!

FULLER COMPANY, Catasauqua, Pa.

Branch offices

Chicago—San Francisco—Los Angeles—Seattle—Birmingham

G-81
1937

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS — COMPRESSORS AND VACUUM PUMPS — FEEDERS AND ASSOCIATED EQUIPMENT

for clean aggregate high capacity

Three of the five 60-inch diameter Telsmith Super-Scrubbers in Colonial Sand & Stone Co., Inc. plant, Port Washington, N. Y.

Most of the better sand and gravel pits are exhausted—those now being used contain more clay which must be eliminated. Many states now require that crushed stone be scrubbed before screening to eliminate soft stone, clay and dirt. This demands a better scrubber—one which will eliminate large amounts of clay with a minimum of expense for installation, water, power, and up-keep. Telsmith's answer is the Super-Scrubber—proven successful in many of the toughest pits and quarries.

Outstanding features of the Super-Scrubber are its high speed, terrific impact and grinding action—very much like that of a ball mill. Aggregate travels from feed to discharge end against clean water flowing in the opposite direction—emerges clean—with clay and dirt disintegrated and carried away by the water. Best results with maximum scrubbing efficiency on coarse aggregate are obtained with the sand removed.

Designed to carry a heavy aggregate load—Telsmith Super-Scrubbers give years of service with a minimum of up-keep expense. Four sizes: 60-inch to 96-inch diameter—capacities, 50 to 250 tons per hour. Send for Bulletin 266.

55-1

Co., Ritten
ether Supply Co.,
Fiala Crushed Stone Corp.
Amico Sand & Gravel C...
Kilbuck Sand & Gravel
Colonial Sand & Stone Co.,
New Enterprise Stone &
Contee Sand & Gravel Co.,
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SMITH ENGINEERING WORKS
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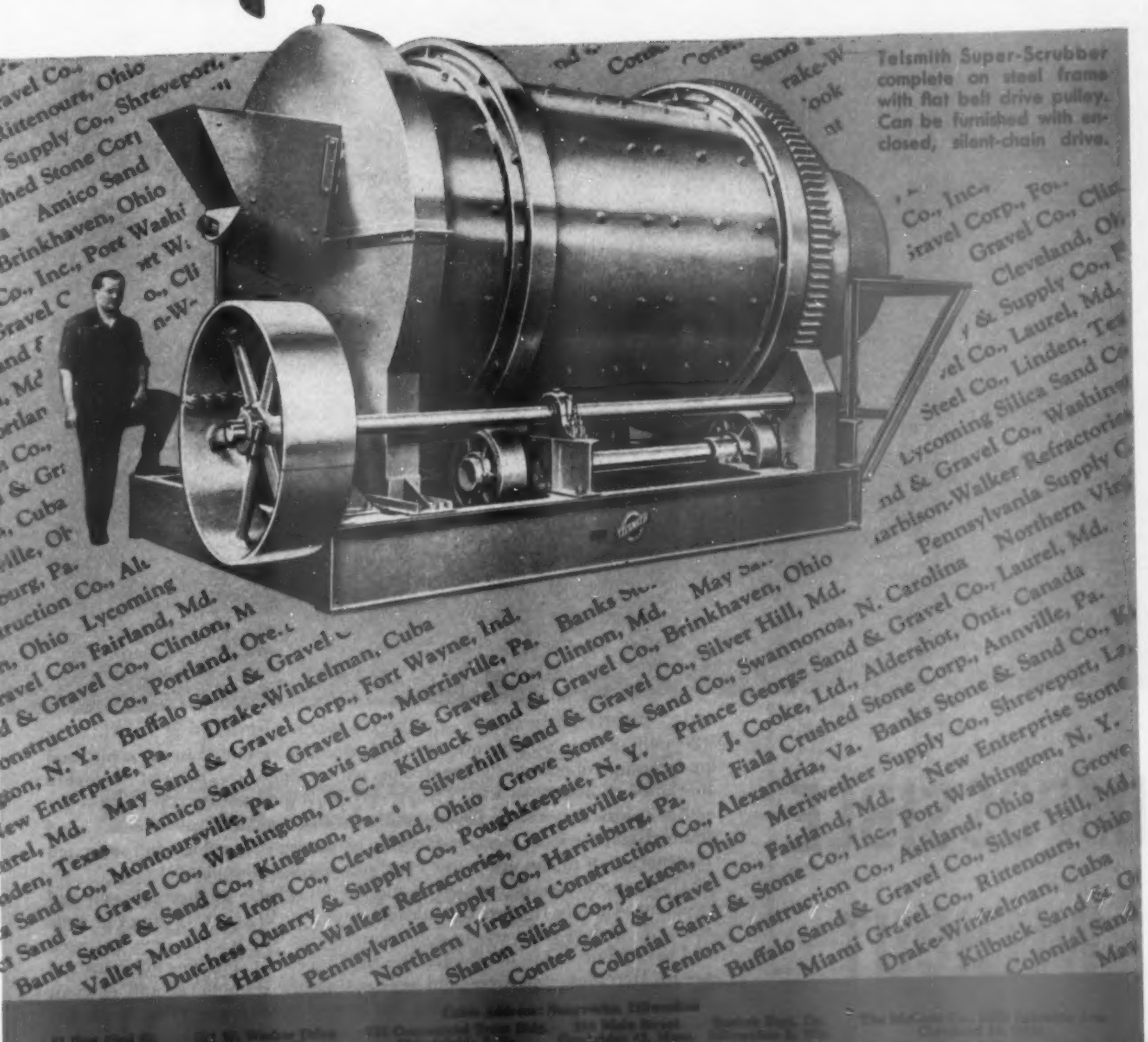
TELSMITH

Super-Scrubbers®



IMPOSSIBLE WITHOUT EXPLOSIVES

120 million tons of iron ore, it is estimated, were mined in open pits and underground operations last year. This photograph shows some of the highly mechanized operations which make such huge production possible.

But before the ore can be dug, millions of pounds of explosives are used to break it loose from working faces, to assure easy shovel digging and rapid transportation of the ore to the crushing and washing plants.

The manufacture of explosives and the knowledge of their efficient and economical use have been Hercules business for 40 years. During this time we have studied the varying conditions under which explosives are used and have pioneered in developing the right types of explosives for industrial needs. Hercules explosives and services assure economical and efficient blasting not only in metal mining, but in coal mining, quarrying, construction—in fact, wherever explosives are used.

HERCULES POWDER COMPANY
INCORPORATED

Explosives Department, 946 King Street, Wilmington 99, Del.

Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N. Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

x954-1

ALLIS-CHALMERS
Air-Quenching
COOLER

FIND OUT—How Many Ways This Cooler Can Cut Costs for You!

SAVE ON INSTALLATION You save up to 30% on installation costs over comparable coolers. Pre-tested and pre-assembled, your cooler is shipped to your site in two sections where it is easily installed without costly revamping of plant. Less headroom is required — there are fewer costly auxiliaries.

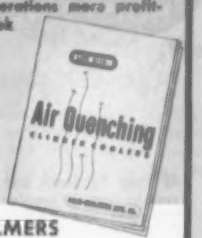
SAVE ON FUEL Movable baffle in air housing above clinker bed isolates and directs hottest air to kiln. Combustion efficiency is greatly increased.

SAVE ON POWER Uniform bed of material passing over grating requires only low pressure air. Comparatively smaller fan and motor uses only about ½ hp-hr per barrel of clinker. Fewer auxiliaries to drive.

SAVE ON MAINTENANCE Simplified design and small number of parts require little attention. Low upkeep cost. Lubrication is required only on drive mechanism. Only four grease fittings. Horizontal grate system insures smooth flowing bed of material and high efficiency cooling throughout. There is little or no wear on grates or grate warpage. Maintenance is only about 1/10 cent per barrel of clinker.

SEND FOR NEW HANDBOOK ON Air-Quenching Coolers

Contains valuable engineering information on cooling that can help make your operations more profitable! It's a book you'll want to have and keep.



ALLIS-CHALMERS
Milwaukee 1, Wis.

Please send my copy of Air-Quenching Cooler Bulletin 07B7869.

Name .....

Company .....

Position .....

Address ..... State .....

A-4262

ALLIS-CHALMERS

On Cranes of All Types, The

Tuffy Team

Will Run Longer!

Now, there is no need to monkey with a lot of different rope constructions trying to find a hoist line and sling combination that will give you the most service. This pair of special purpose constructions will handle your crane work as it never was handled before.

Oldest of this tough work-team is Tuffy Slings. From the very start they set new standards of service life throughout industry—continue to set records in keeping sling cost down and the safety record clear. The reason? An entirely new patented 9-part machine braided wire fabric construction so flexible you cannot materially damage the fabric when kinking and knotting, and so tough that users asked for a hoist line to match in wearability.

Newest of the hoisting team is Tuffy Hoist Line. It's a new rope construction, specially designed for the special purpose of hoisting on any and all cranes. Designed into it is flexibility, wearability and extra toughness to absorb load shocks. Taken out of it is every undesirable feature which many months of laboratory research and testing and many more months of field testing uncovered in other rope constructions used for hoist lines.

Just length, diameter and "Tuffy Hoist Line" is all you need to say! No complicated specifications, no chance for confusion! Get *extra* hoisting service at no extra cost with Tuffy Hoist Line!

NEW Tuffy HOIST LINE

Tuffy SLINGS

48-Page Handbook and Riggers' Manual, sent to you on request! Write today for handbook and complete information on Tuffy Hoist Line.

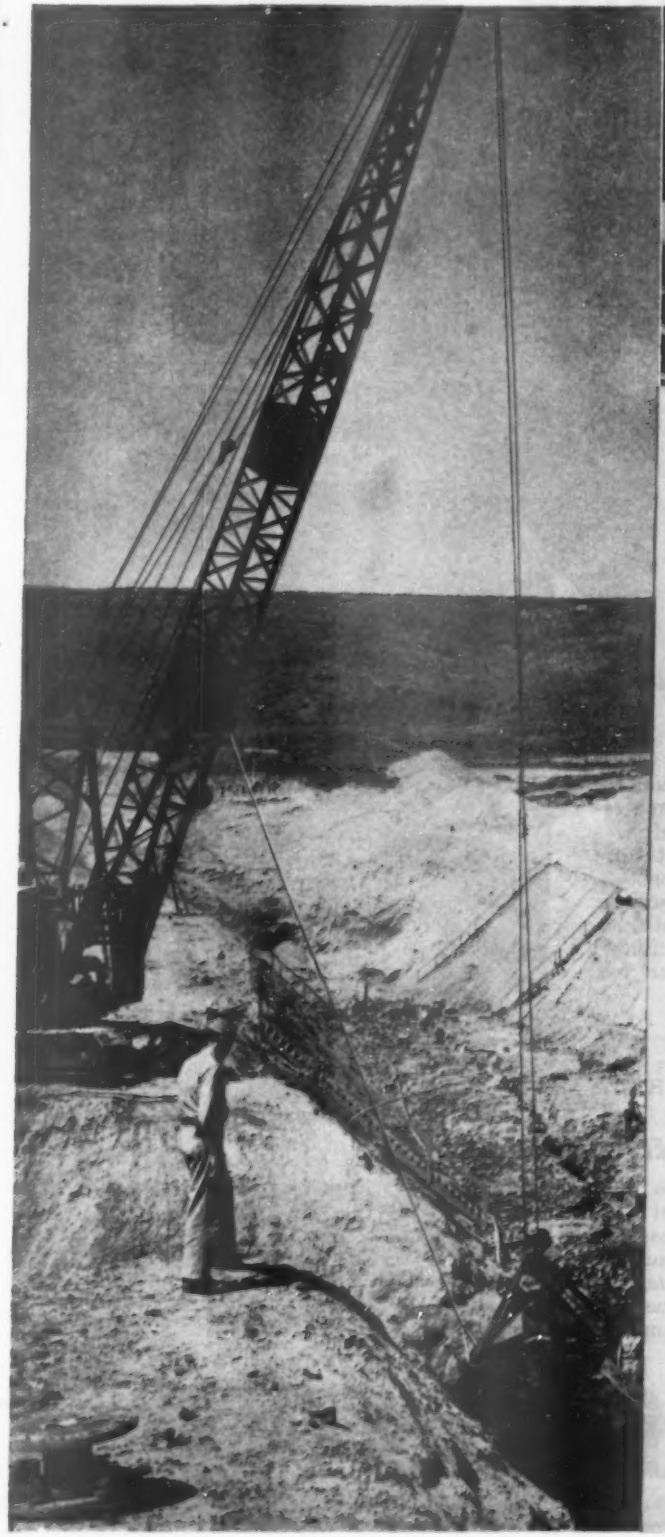
Be Sure...Be Firm
Tell Your Distributor Tuffy Hoist Line...
and the diameter and length—that's all he needs to know! For slings, specify Tuffy, sling type, diameter, length and fittings. Or buy Tuffy Braided Wire Fabric on the reel if you do your own rigging. Remember, your distributor can always supply the Tuffy you need!

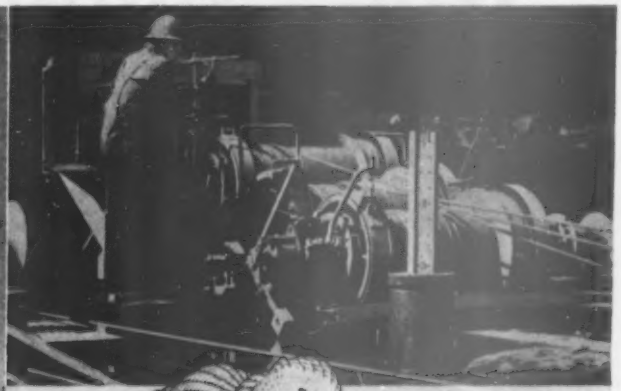
union Wire Rope **corporation**

2156 Manchester Ave. • Kansas City 26, Mo.

Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

OR ON CLAMSHELLS AND DERRICKS





A NEW

Tuffy® HOIST LINE

Designed to Out-perform Any Rope Construction You've Ever Used For Crane Hoisting!

No doubt you've used several different rope constructions on different crane hoisting operations. Now, there is an entirely new construction for crane hoisting purposes which gets you out of complicated specifications in ordering and enables you to keep your reserve rope stock down to the very minimum.

Tuffy Hoist Line is now on the market because no other rope construction could stand up to it through many months of testing in the unmatched Union Wire Rope laboratory. More months of field testing, under tough operating conditions, proved to machine operators the superiority of Tuffy Hoist Line over the best rope constructions they had ever used for Crane Hoisting.

That is the best way for you, too, to see how much longer Tuffy Hoist Line will run on your clamshells, derricks and cranes. All your distributor needs besides the name *Tuffy* is the diameter and length.

Tuffy DOZER ROPE

Increase your dozer rope service by mounting a 150' reel of Tuffy on your dozer. Feed through only enough to replace section damaged on the drum. Available in 1/2" and 9/16".

Tuffy SCRAPER ROPE

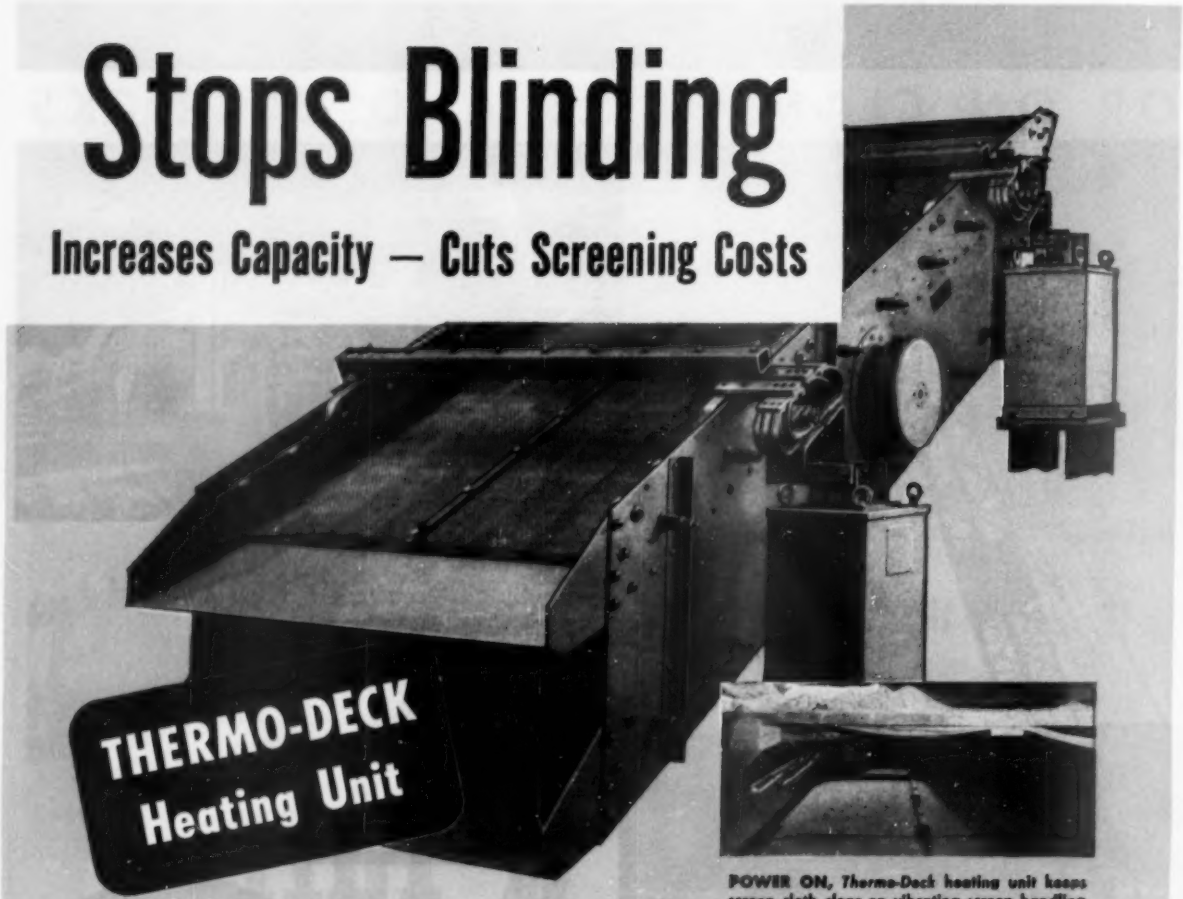
Flexible enough to withstand sharp bends... still enough to resist looping and kinking when slack!

Tuffy DRAGLINES

Maximum abrasive resistance, extra flexibility! Rides better on grooves, hugs drum when empty!

Stops Blinding

Increases Capacity — Cuts Screening Costs



You can screen fine, moist material *continuously* with a *Thermo-Deck* heating unit. No down time required to clear fine or medium mesh screen cloth!

Heated screen cloth remains open . . . you get *more* tonnage through the screen and better separation.

Operating records prove that heated wire cloth screens last up to three times longer than non-heated cloth, because they do not have to be pounded free of blinded material. For the same reason, you save man-hours too. These lower costs increase your profits.

The *Thermo-Deck* unit can be applied to Allis-Chalmers screens in the field. See your nearby Allis-Chalmers representative for complete details. Or write Allis-Chalmers, Milwaukee 1, Wis., for Bulletin 07B7812.

A-4273

POWER ON, *Thermo-Deck* heating unit keeps screen cloth clear on vibrating screen handling fine, moist material.

POWER OFF, troublesome blinding occurs. This view shows same screen as above, with *Thermo-Deck* unit shut off.

For Intermittent Feed... ADD A *STA-KLEEN* DECK

If feed is intermittent, fine material may bake on the wire cloth during interruptions in feed. Heat which ordinarily is absorbed by moist material increases the temperature of the wire cloth sufficiently to cause any fine material to bake on. The addition of a *Sta-Kleen* deck effectively prevents this. Bouncing rubber balls between the screen cloth and a ball retaining deck clear the cloth of baked-on particles.

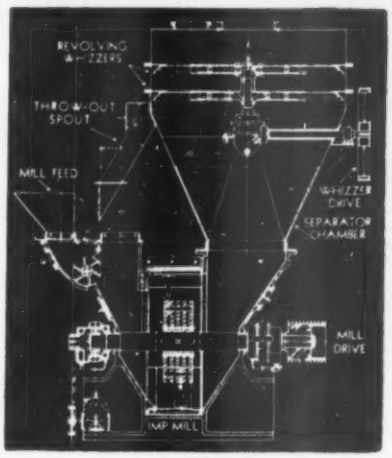
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Thermo-Deck and *Sta-Kleen* are Allis-Chalmers trademarks.

Simplify your CHEMICAL GRINDING with Raymond

WHIZZER EQUIPPED IMP MILL



Cross-section showing location of revolving whizzers and drive.

The Whizzer-equipped Imp Mill combines pulverizing, classifying and conveying of materials in a continuous, automatic process which saves re-handling. In a great number of cases, Flash Drying accessories may be added to the equipment for simultaneously removing moisture while pulverizing.

One simple adjustment of the whizzer provides a wide range of fineness control to 99.9% or better passing 325 mesh. Requiring a minimum of supervision, this unit will, with a given setting, deliver a consistently uniform fineness product. Where these mills are used for moisture removal, they have the ability to hold final moisture content within narrow limits.

The Raymond *whizzer* Imp Mill is a proven low-cost producer of finely ground clays and fillers, pigments, phosphate materials and a great variety of chemicals and non-metallic minerals. In many instances, it will show important savings in the production of these and similar materials.

Write for Catalog No. 67

COMBUSTION ENGINEERING, INC.

Raymond Division

1307 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

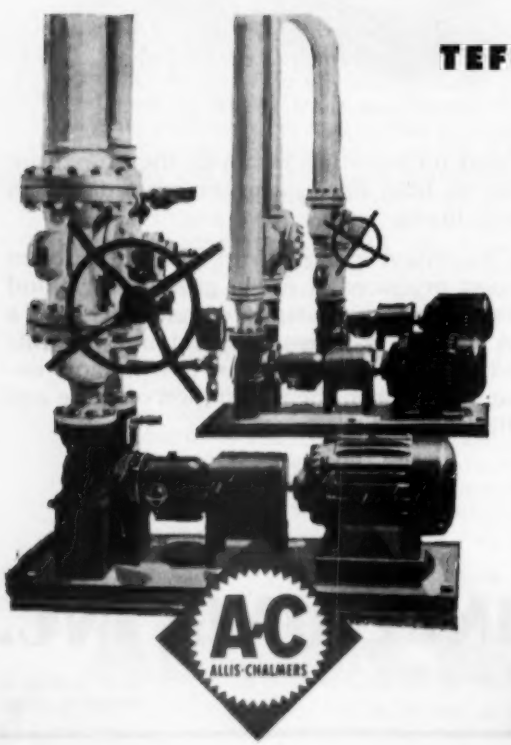
GREATER PROTECTION AGAINST FOREIGN MATTER—LONG

new motors - new

OPEN—DRIP-PROOF

Here are a few of the reasons why the new Allis-Chalmers open—drip-proof motor in NEMA rerate sizes will give you better performance and lower maintenance costs in general-purpose applications.

- Better protection against falling water and debris because cooling air inlets are on bottom.
- Long bearing life because large grease chambers provide plenty of reserve lubricant and are thoroughly sealed against foreign matter.
- Quieter operation, smoother performance.



TEFC and EXPLOSION-PROOF

For especially dirty, corrosive or hazardous applications, you will get top performance with low maintenance costs from the new Allis-Chalmers totally-enclosed, fan-cooled and explosion-proof motors in NEMA rerate sizes. Here are a few of the reasons:

- Foreign matter kept out of bearings and motor interior by double labyrinth seals inside and outside of bearings, and long running fits between shaft and seals.
- Bearing maintenance reduced because large grease chambers provide space for reserve lubricant; also, if required, grease may be renewed without dismantling.
- Easy to clean — no inaccessible air passages. Dirt wipes or blows off easily.

ALLIS-

LIFE BEARINGS—MANY TRIED AND PROVEN FEATURES

GET COMPLETE INFORMATION NOW

Allis-Chalmers, Milwaukee 1, Wis.

Send for these bulletins:

- ☐ Open — Drip-Proof, Type G, 5186210
- ☐ TEFC, Type GZ, 5187225
- ☐ Explosion-Proof, Type GZZ, 5187286

Name.....

Company.....

Position.....

Address.....

City and State.....

A-4280

CHALMERS

MANITOWOC 2000 BEST 1¼ yd. MACHINE BAR NONE!

Thousands of Manitowoc 2000 owners have proved to themselves that it's the fastest, most powerful, most productive 1¼ yd. machine in its class — in fact, it will match many machines in the 1½ yd. class.

It has BIG capacity — 25 tons lift at a 12' radius. It has tremendous power at the dipper, because of simplified design — only 13 gears throughout, and each one saved adds power at the dipper. It has faster working speeds — TORQUE CONVERTER drive, if desired — rugged construction throughout, and long, wide crawlers for maximum stability.

It's big in performance, yet fast from job to job. Can be "trailered" or shipped on a flat car, without any dismantling, except if long crane boom is attached. Offers you the most versatile choice of optional equipment and attachments.

Before you buy any excavator, get complete details on this versatile Model 2000. Manitowoc Engineering Corp., Manitowoc, Wis.

FASTER CYCLES

Fast, safe operating speeds mean higher output. Compare hoist speeds as high as 216' per minute, swing 4.15 R.P.M. and travel 1.05 M.P.H. Simplified design — simplified operation, mean more yardage on any job.

Master of Many Jobs

- **LIFT CRANE**, with hook block and single ship line.

- **CLAMSHELL**, with torsion spring tagline and automatic holding line take-up.

- **DRAGLINE**, with swivel type fairlead, 1¼ yd. general purpose.

- 1¼ yd. **STANDARD SHOVEL** with 22½' boom, 16' sticks.

- **HIGH LIFT** 1¼ yd. **SHOVEL** with 26' boom, 18' sticks.

- **TRENCH HOE** with 22' boom, 12' stick, and 1¼ yd. capacity.

MANITOWOC

SHOVELS 1-5 YD. — CRANES 18-100 TON

Speed Train

THE UNBEATABLE COMBINATION FOR *Profit!*

SUPER-HIGH OUTPUT HERE

SUPER-LOW MAINTENANCE HERE

IT'S YOURS IN THE Cedarapids Built by IOWA

SUPER TANDEM

ASK Super Tandem owners about Super Tandem performance! One contractor produced 3/4" minus material at a rate of 228 to 310 tons per hour with average percent of crush 20%. On this job, maintenance costs on the Super Tandem were less than three-fourths of a cent per yard! Figure out what this kind of low-cost production will mean on *your* jobs!

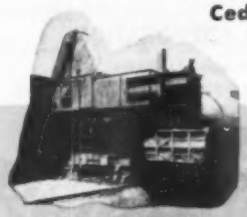
The Cedarapids Super Tandem is newly engineered for the extra high screening capacity that gives you a big advantage in any pit and is especially profitable where there is a high percent of fines or contaminated material.

Look over the features listed at the right, then ask your Cedarapids distributor to show you how you can apply them to your work for higher profits.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

CHECK THESE FEATURES

- √ Big 48" x 12' 2½ Deck Horizontal Vibrating Screen assures really high screening capacity, particularly desirable where gradation of a big volume of material is necessary.
- √ 2416 Roll Crusher and 1036 Jaw Crusher deliver a steady flow of crushed material.
- √ Flexibility with optional Swivel Feed Conveyor, Spray Bar attachments and Sand Ejector Screw to meet every job condition.
- √ Delivery conveyors, plant conveyor and under-crusher conveyor are 30" wide to handle the increased screening capacity of the plant.
- √ Quality construction of every unit cuts maintenance costs to the minimum, keeps plants operating all day every day to maintain your high production averages.



Master Bituminous Mixing Plant

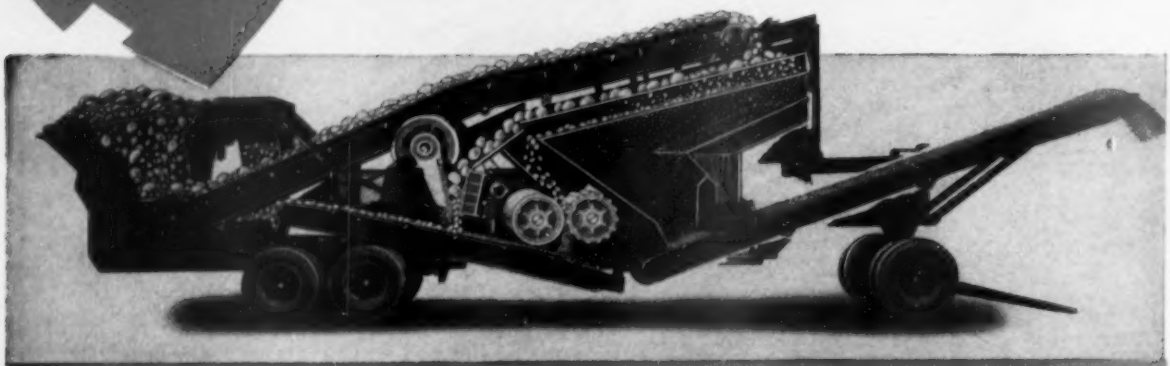
Vibratory Soil Compactor

Motorized Head Pulley

Model G-60 6000-lb. Bituminous Mixing Plant

designed for MORE PROFITS

WITH UNIVERSAL'S "SCALPING DECK" METHOD



UNIVERSAL 880 GRAVELMASTER

Universal's "Scalping Deck" method of screening assures balanced loads to the jaw and roll crushers . . . provides greater efficiency and economy, protects screen, jaws, and rolls. You get better gradation of material, less jaw wear, less roll shell wear, longer screen life, savings in power, more effective use of screening area, faster material flow, greater plant output. These all add up to more tons per hour at less cost per ton with the new Universal 880 Gravelmasters.

Strictly for profit . . . buy a Gravelmaster. Get top engineering design. Get the rugged stability of a permanent installation plus ready portability to produce profitably anywhere.

Complete, compact Universal Gravelmasters are built in a range of streamlined sizes with capacities from 75 to 320 tons per hour. They're used extensively as complete gravel crushing, screening and loading plants, or to step up production as secondaries following a primary in quarry operations. For complete details on the size that meets your requirements ask your Universal distributor or write.

MODEL	Junior "B"	Junior	Senior "R"	Super Senior
Jaw Crusher	10"x16"	10"x24" 10"x36"	10"x36"	10"x36"
Roll Crusher	18"x16"	24½"x16"	30"x24"	40"x24"
Gyrating Screen	2'x8' 2½	3'x10' 2½	4'x12' 2½	5'x12' 2½
Plate Feeder	19"	19"	25"	25"
Weight	28,600#	44,500#	54,000#	59,600#
CONVEYORS				
Under Conveyor	18"x10'	24"x14'	30"x18'	30"x19'
Feed Conveyor	20"x23'	24"x26'	30"x29'	36"x34'
Delivery Conveyor	24"x18'	24"x20'	30"x21'	30"x24'
	Front Discharge Folding	Front Discharge Folding	Front Discharge Folding	Front Discharge Folding

UNIVERSAL ENGINEERING CORPORATION Divison of PETTIBONE MULLIKEN CORPORATION

617 C Avenue N.W., Cedar Rapids, Iowa
Phone 7105

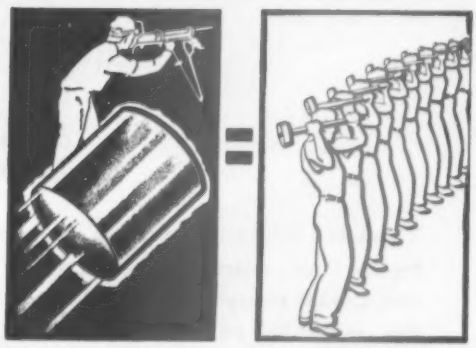
4700 West Division St., Chicago 51, Illinois
Phone Spaulding 2-9300

Do these jobs at lower cost:
• Remove rings in kilns.
• Remove protruding rocks.
• Scale walls and ceilings of quarries, mines and tunnels.

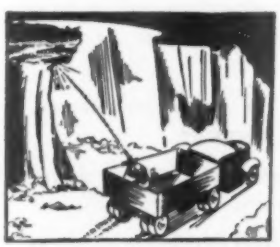
The Remington Industrial Gun will save you time and money!

Especially designed for the cement and mining industries and lime refractories . . . the Remington Industrial Gun eliminates old-fashioned methods of removing rings! One man operates it . . . firing a few well-placed shots that loosen the ring and cause it to crumble when the kiln is rotated. There's no need to shut down the kiln and consume time cooling and reheating it.

For folder giving further information, write to Remington Arms Company, Inc., Bridgeport 2, Conn.



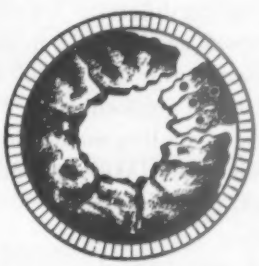
ONE MAN . . . OR MANY? The Remington Industrial Gur makes it possible for one man to destroy heavy obstructions that formerly required the time of several men working in restricted or hazardous positions.



The Remington Industrial Gun Has Many Uses

It's handy for scaling the ceilings and walls in mines. The illustration shows how the gun can be used to remove protruding rocks, ice and other obstructions at inaccessible points where conditions permit this kind of operation.

Remington Industrial Guns are leased—$200.00 the first year, $25.00 per year thereafter.



Cutting a "key way." A few well-placed shots will loosen a section of clinker . . . weaken the rest of the ring . . . usually cause it to fall when kiln is rotated.

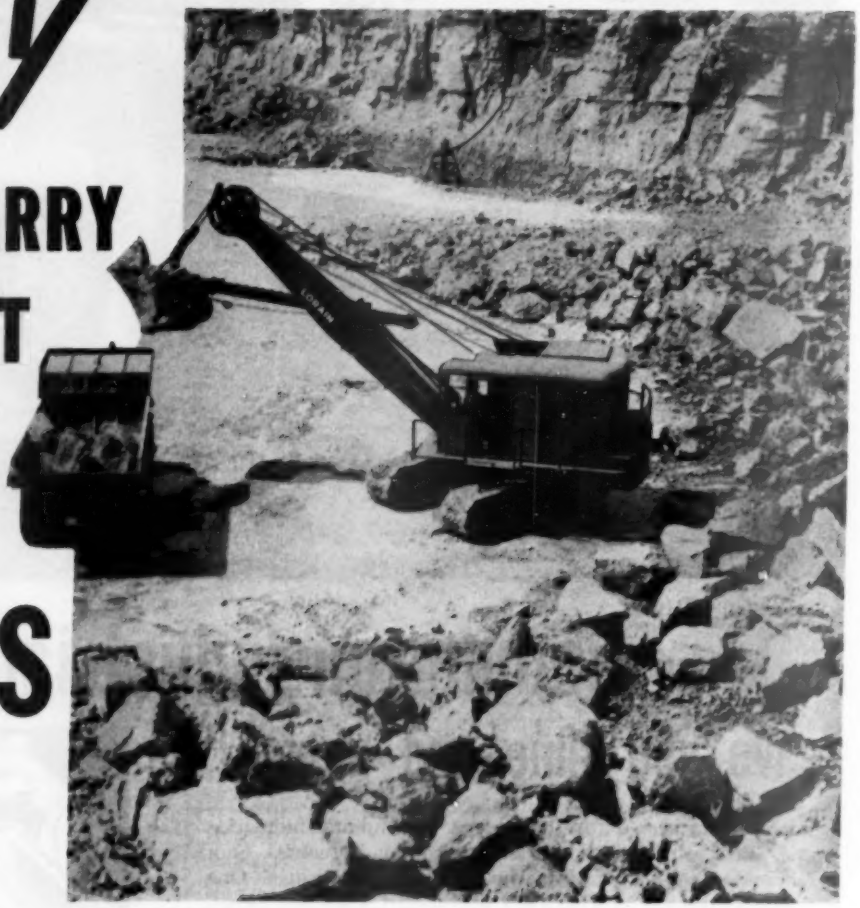
Remington Industrial Shells are loaded with a powerful 3-ounce lead projectile that develops 7475 foot-pounds muzzle energy.

"If It's Remington—It's Right!"

Remington DU PONT

WHY THIS QUARRY BOUGHT 15 LORAINS

• This 2-yd. Lorain shovel, model 820-K, is the 15th Lorain purchased by a large quarry with operations in Ohio. It is shown loading dolomite, working a 35 ft. face.



This Ohio quarry is one of five operations owned by the same company. In each of the five quarries, Lorain shovels are at work. Over the years, this owner has purchased a total of 15 Lorains . . . each the result of the outstanding performance of the previous Lorains.

In the photo, a new 2-yd. Lorain shovel, model 820-K, is shown loading dolomite. It's tough digging and steady work against a 35 ft. face. According to this owner, the new "820" is a big step forward in shovel performance. The Hydraulic (fluid drive) Coupling makes shovel digging smooth and shock-free. Air-controlled steering and tread lock, plus air-assist on friction clutches make operation easier and speed-up the shovel's loading cycle.

Extra Values that Pay Profits in the 2-yd. LORAIN 820

- Hydraulic Coupling (fluid drive) is the standard Power Take-Off on the "820". No shock — improves engine "hang-on", no-engine stall, reduces vibration. No other 2-yd. class machine offers this feature.
- Air controls contribute to better performance, greater production, easier operation.
- Choice of 5 interchangeable booms — shovel, crane, clamshell, dragline and hoe.
- See your nearby Thew-Lorain Distributor about the Lorain-820 . . . and the rest of the Lorain line.

THE THEW SHOVEL CO., LORAIN, OHIO

TAKE THE SHOCK OUT OF ROCK WITH

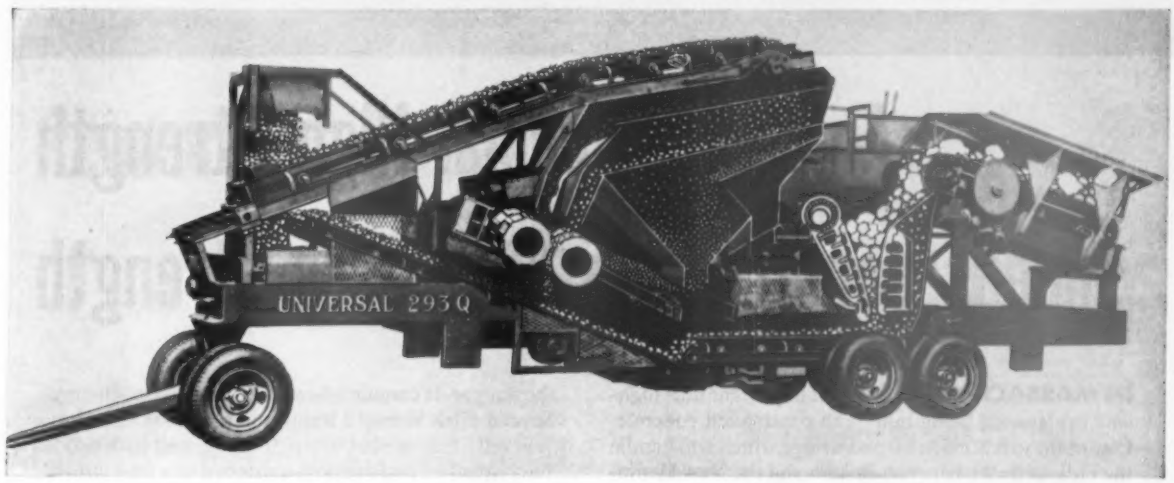
THEW LORAIN® 820 SERIES

The UNIVERSAL 293Q TwinDual PACEMAKER

gives you these EXCLUSIVE Profit-Making Advantages

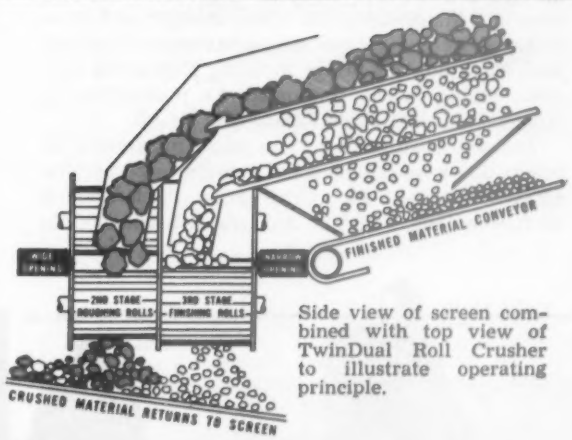
- TwinDual Roll Crusher
- Three separate crushing operations
- Primary and Secondary on single truck
- Only one plant to move instead of two
- Only one power unit to service
- Flexibility for rock or gravel
- 20% greater screening efficiency
- Better quality finished aggregate
- Lower initial cost — lower maintenance cost
- Top production

Jaw crusher and Apron feeder are mounted on separate skid frame to meet highway weight limits.



PIT OR QUARRY — rock or gravel. Name your operation. The TwinDual Pacemaker sets new standards for profitable hour after hour tonnage at low cost per ton. Three crushing operations with Universal's exclusive TwinDual Method provide top capacity, divide the load between three crushing stages. Permit a more favorable ratio of reduction resulting in longer crusher life, less maintenance and better quality finished product.

There is much more to the profitable TwinDual Story. Facts are yours for the asking. Bulletins U520 and U501 will give you detailed information.



Side view of screen combined with top view of TwinDual Roll Crusher to illustrate operating principle.

UNIVERSAL ENGINEERING CORPORATION subsidiary of PETTIBONE MULLIKEN CORP.

617 C Avenue N.W., Cedar Rapids, Iowa
Phone 7105

4700 W. Division St., Chicago 51, Illinois
Phone SPaulding 2-9300

Prestressed supporting beams were specified for Scotland Road Bridge, just north of Boston, Massachusetts, to provide extra strength and maximum resistance to cracking. After rigorous tests, no beam for this bridge has been rejected.

American Special High Strength speeds construction, increases strength

IN MASSACHUSETTS, seven important new highway bridges are being built with prestressed concrete. One of these is Scotland Road Bridge which will handle the bulk of traffic between Boston and the New Hampshire and Maine turnpikes. Extra strength and durability, as well as exceptional resistance to cracking, were built into this bridge by using prestressed concrete bridge beams reinforced by post-tensioning American High Strength Reinforcing Strand.

The slab road surface rests on 24 prestressed H-beams that were designed and manufactured by New England Concrete Pipe Corporation. Each beam is 66 ft.-4 in. long, 3 ft.-6 in. deep and 1 ft.-6 in. wide at the flanges. It contains three 1 9/16", 61-wire American Special High Strength Reinforcing Strands (not strain relieved) that are cut to length at the mill with end fittings attached and are post-tensioned to a final stress of 110,000 psi. by the manufacturer of the beam. This stress is 50% of the strand's ultimate strength . . . and more than 5 times as great as the 20,000 psi. allowed for ordinary concrete reinforcement. Post-tensioning keeps the concrete under compression, prevents destructive cracking, reduces maintenance, and increases the useful life of the concrete. The 24 beams for Scotland Road Bridge were installed in just 7 hours.

Beams were prefabricated at Boston, then trucked to the job. All 24 beams were placed in just 7 hours with 2 mobile cranes.

Each of the beams in this prestressed concrete bridge at Glen Iron, Pennsylvania contains eighty ¼-in American Special High Strength Reinforcing Strands. The beams for all 5 spans were erected in less than 6 days.

Reinforcing Strand of *Prestressed* concrete bridges

IN PENNSYLVANIA, more than 125 concrete highway bridges have been built with Pretensioned-Prestressed Concrete Bridge Members manufactured by Concrete Products Co. of America, Division of American Marietta Co. These extra strong bridge members all are reinforced with American Special High Strength Reinforcing Strand regular grade (not strain relieved).

The largest of these bridges, shown above, was erected in 1952 at Glen Iron, Pa. It contains 45 Pretensioned-Prestressed Members that are reinforced with ¼" diameter American Special High Strength Reinforcing Strand. Each beam is 53 ft. long, 3 ft. wide, and 33 inches deep.

These pretensioned bridge beams require only about one-fourth as much steel as conventional reinforced concrete bridge members; they resist cracking better; yet they cost about *25% less*, installed, than conventional members of equivalent strength. In tests, these pretensioned beams withstand loads 3 times greater than those required by Standard Specifications for Highway Bridges.

American Steel & Wire has been the pioneer in furnishing special reinforcing strand for pretensioning systems of prestressed concrete in both regular and strain relieved grades.

Why American Special High Strength Reinforcing Strand was chosen for these bridges

1. It has good creep resistance, as well as a high ultimate strength of 238,000-268,000 psi. depending on wire size.
2. It is flexible and easy to handle.
3. It bonds firmly with the concrete when small diameter strands are used.
4. It assures consistent results . . . is uniform in size, strength and ductility.

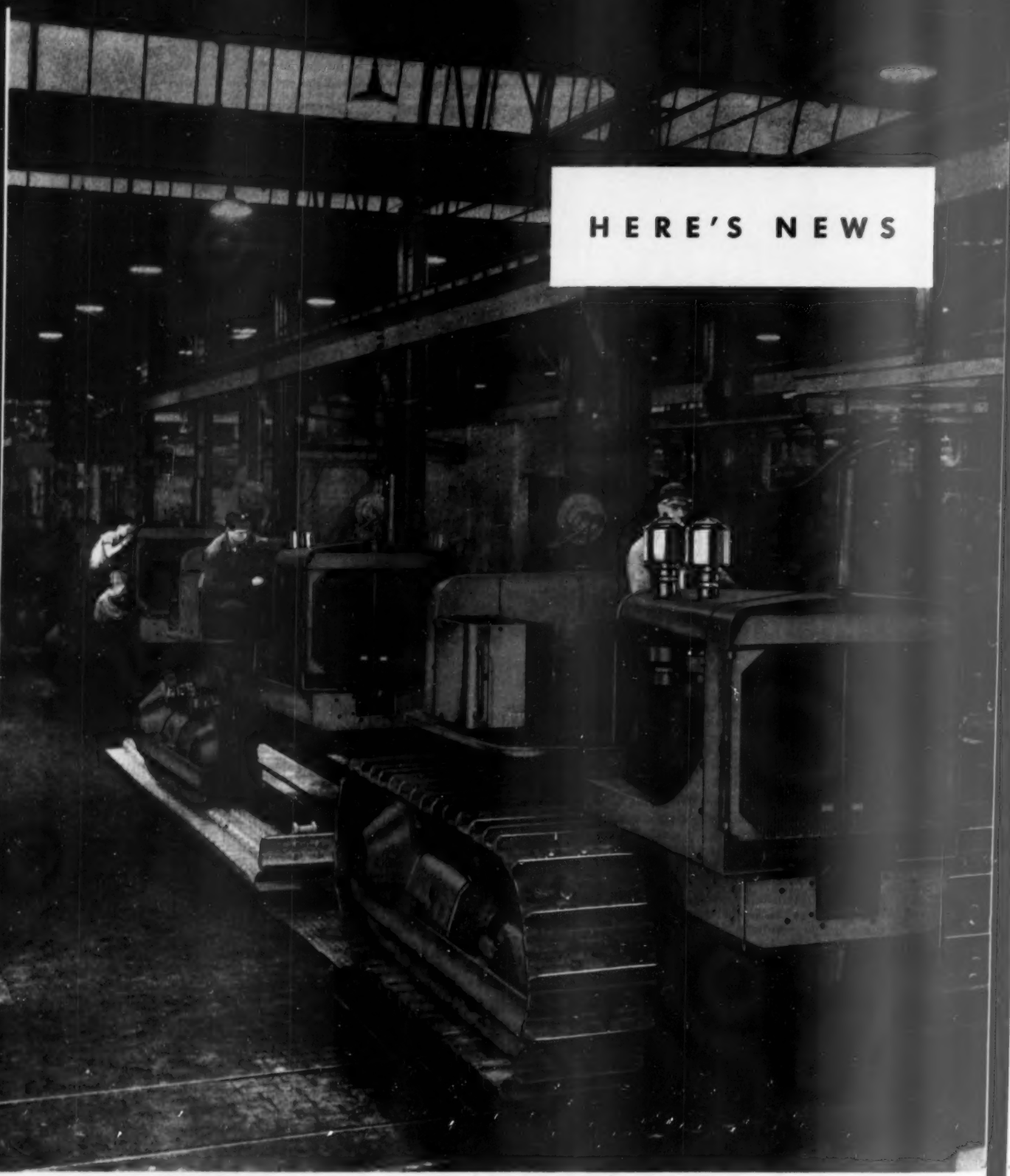
Write for complete information about American Special High Strength Reinforcing Strand. American Steel & Wire, Room 842, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION · UNITED STATES STEEL CORPORATION · GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN *Super-Tens* WIRE *and* REINFORCING STRAND

USS

UNITED STATES STEEL



They're here now! **28,000-lb. HD-15's with torque converter drive are already rolling off the assembly line.**

Allis-Chalmers Powerful HD-15 adds to its big work advantages

. . . now offers choice of two outstanding drives—

standard transmission with time-saving shift pattern,

or widely accepted hydraulic torque converter drive

From its introduction, the Allis-Chalmers HD-15 has set new standards in performance and long-life service . . . in a new size class. It combines outstanding strength and balance with plenty of power, plus a simplified, time-saving transmission that gives big work output. In addition, the HD-15 offers remarkable service simplicity, with features like unit assembly and 1,000-hour lubrication intervals for truck wheels, idlers, and support rollers. It has proved itself the kind of tractor required on today's jobs.

Now, hydraulic torque converter drive is added as optional equipment — an additional working advantage for the powerful HD-15. This advanced design drive was introduced by Allis-Chalmers in the world's *first* torque converter tractor nine years ago. This modern drive gets more done because it automatically provides the right combination of speed and pull every working minute . . . and hydraulic cushioning assures longer life for both tractor and auxiliary equipment.

Now you can choose the HD-15 with standard transmission *or* hydraulic torque converter drive. Either way you'll be getting the most advanced tractor in the business. Let your Allis-Chalmers dealer give you *all* the reasons why.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

TORQUE CONVERTER

Symbol of greater output, longer life.

WHICH OF THESE 4 OPERATIONS IS YOUR KEY TO COST CUTTING?

1. BLASTING
2. ROCK HANDLING
3. EQUIPMENT MAINTENANCE
4. PROCESSING

BLASTING IS THE KEY . . . . blasting with KING DETONITE, and we'll prove it to you right at your own quarry (see coupon below). With proper blasting, you get important reductions in *all* of these 4 major operating costs:

1. BLASTING COST

KING DETONITE is a slow-detonating powder. Its slow, heaving, spreading action lifts and fully displaces the burden. High cost of secondary drilling and shooting is greatly reduced.

2. ROCK-HANDLING COST

KING DETONITE breaks up rock into sizes that permit shovels to dig efficiently at all times, thus reducing handling costs to a minimum.

3. EQUIPMENT MAINTENANCE COST

KING DETONITE's proper fragmentation means less wear and tear on expensive equipment . . . less cost for maintenance and replacement.

4. PROCESSING COST

KING DETONITE's proper fragmentation allows your crushers to operate at top capacity, thus lowering cost of processing the stone.

4 WAYS TO CUT COSTS

King Powder Co., Inc.
Cincinnati 1, Ohio

SHOW ME how DETONITE will cut my costs 4 ways. Without obligation, have the King Representative get in touch with me to arrange for a DETONITE demonstration right at our quarry.

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Title_____
Company_____
Address_____

or phone us collect

KING DETONITE

PATENTED SURFACE-SENSITIZED EXPLOSIVE

1878 ▽ 1953

THE KING POWDER CO., INC.

CINCINNATI 1, OHIO

SYMONS VIBRATING ROD GRIZZLIES for heavy duty big capacity scalping from ½" up to about 4".

SYMONS VIBRATING BAR GRIZZLIES for heavy duty large capacity primary scalping from 1 ½" upwards.

SYMONS VIBRATING ROD DECK SCREENS for low cost, big capacity screening of wet and sticky material.

SYMONS® SCREENS

...from the *HEAVIEST SCALPING*

...to the *FINEST SCREENING*

SYMONS HORIZONTAL SCREENS for level, positive screening with greater capacity of more accurately sized products . . . ideal for asphalt plants—with drive outside dust and heat.

● *SYMONS VIBRATING SCREENS* have been serving the non-metallic minerals industry for almost twenty years. The wide range of types and sizes enables you to select the *right* screen for your particular application.

These quality screens have gained an enviable reputation for dependability, efficiency and economy . . . backed by the same high standards of accuracy, design and workmanship, and the same advanced engineering that is used in the manufacture of *all* Nordberg Machinery.

Mail the coupon for further details.

SYMONS "V" SCREENS for big capacity single cut wet or dry separations—even in much finer meshes than possible with conventional screens.

SYMONS... *A Registered Nordberg Trademark Known Throughout the World*

NORDBERG MFG. CO., Milwaukee, Wisconsin

NORDBERG

MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

NEW YORK • SAN FRANCISCO • DULUTH • WASHINGTON
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MAIL THIS COUPON TODAY

NORDBERG MFG. CO., Milwaukee, Wisconsin RP

Please send me further information on the following screens for coal preparation service:

☐ Symons Horizontal Screens ☐ Symons "V" Screens
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Company _____

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S254

We grind truck axles to

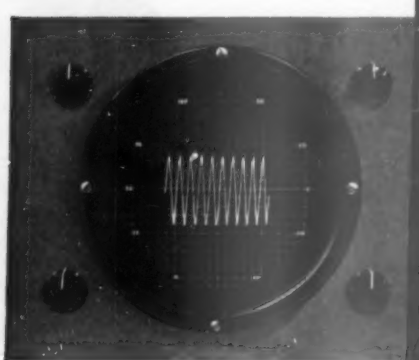
in the new Timken-Detroit indoor proving ground . . . and only

We jounce, twist and grind them. We abuse, torture and ruin them. We duplicate any on-the-job hauling situation . . . then add several special brutal tests of our own.

And for good reasons! We can assure you in advance that a Timken-Detroit axle can take a harder beating on the job it was built for than any other axle made!

We capsuled a multi-thousand acre proving ground into one room. Here our engineers put 50 years of experience in building axles for trucks, buses and trailers to work. Here the axles and gearing are subjected—*indoors*—to any *outdoor* hauling condition . . . and scientifically analyzed.

It's research to the "umpteenth" degree. But *you* enjoy: longer truck life; less maintenance, repairs and downtime; lower operating costs. That's why the smart money of truck builders and owners rides on Timken-Detroit axles and gearing.



Whatever you haul . . . simulated service conditions show up electronically on a screen like this. For instance—a heavily loaded truck on a bumpy, twisting road—then on a level express highway or long grade. What happens to the axle and gearing is measured, charted with absolute scientific accuracy.

TDA proves axle quality and performance in this "Torture Chamber"

Here we simulate actual highway conditions . . . test quality and performance of axles under any hauling situation, such as duplicating the kinetic energy of 80,000 lbs., G.C.W., at 60 m.p.h. All tests are repeated hour after hour with an automatic cycling control.

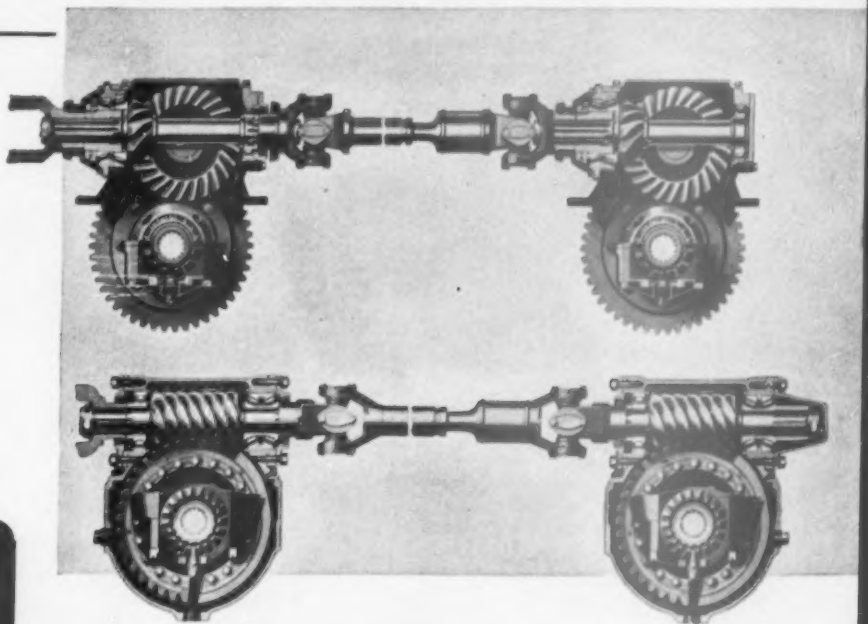
You're hauling overburden . . . you want axles that can get you up, out and on the road—fast . . . with few shifts, low engine r.p.m. and skimpy gas consumption. You want to stay on the job . . . with little expense for maintenance or repairs plus long axle life. You want Timken-Detroit "Torture-Tested" axles with Hypoid gearing!

You're hauling wet concrete . . . you can't afford axles that "conk out" enroute. You want axles you know *for sure* will take off and get the mix to the job—*on time*—ready to pour. You don't want costly maintenance and repairs or shoptime. You want rugged Timken-Detroit "Torture-Tested" axles with Hypoid gearing. They save you money.

You're hauling sand . . . you want axles that can get the load up and out of anywhere . . . then speed it to the dumping area and get back quick. You don't want to beat your engine to death . . . or have profit-eating maintenance, repairs or downtime. You want axles that can stand up—Timken-Detroit "Torture-Tested" axles with Hypoid gearing.

pieces

Timken has it!



TIMKEN Detroit AXLES

TIMKEN DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted TDA Standard

TRADE MARK REGISTERED

"TORTURE-TESTED"
to Save Money on the Job

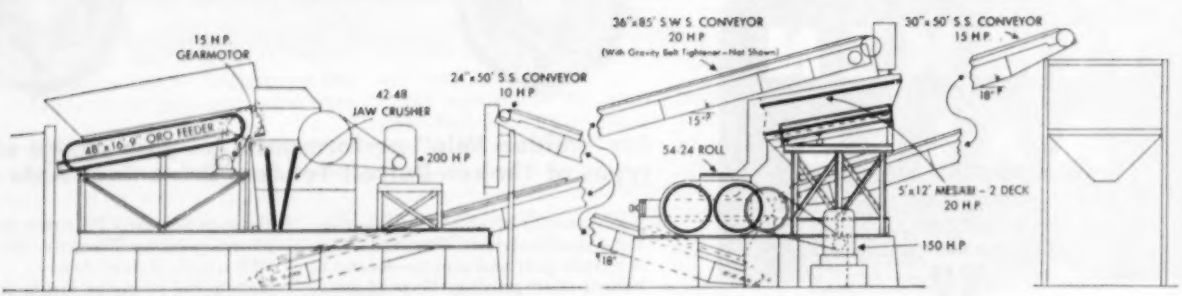
WORLD'S LARGEST MANUFACTURERS OF AXLES FOR TRUCKS, BUSES AND TRAILERS

For "Million Mile" performance . . . your choice of two types of Timken-Detroit Tandem Drive Rear Axle Units

1. Top-mounted hypoid-helical double-reduction final drive. First reduction is hypoid gear and pinion—second is helical spur-gearing. Hypoid gearing, developed for heavy-duty trucks by Timken-Detroit, assures outstanding performance and low maintenance costs for operators everywhere. Large piniona, greater tooth contact give TDA hypoid-helical gearing the ability to stand the "gaff" of extreme shock loads and hard, gruelling hauling service.

2. Famous *patented* FJ worm gearing, pioneered by Timken-Detroit. "Through Drive" type . . . direct transmittal of engine torque through forward driving axle to rear driving axle. Permanently silent . . . simple, sturdy . . . stands extreme shock-loads without damage. Large diameter worm and worm wheel . . . increased capacity roller bearings . . . easy lubrication . . . light weight make FJ highly desirable for high speed service on any kind of grades.

Plants at: Detroit, Michigan
Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania



EXTRA BIG EQUIPMENT SPEEDS WORK ON WEST VIRGINIA TURNPIKE JOB

In the mountain country of West Virginia, big contractors anticipating turnpike jobs are watching closely the rapid progress being made on the new West Virginia turnpike. And the center of attraction is a high capacity, low cost rock crushing plant near Cabin Creek which is preparing 575,000 tons of 3" minus material with a minimum of 15 percent fines for the base course and paving on 20 miles of the new super-highway.

This crushing plant is owned by the Frank Mashuda Co., Gallagher and Nelson, and the Arthur Overgaard Co.

Crushing 450 Tons Per Hour

The plant operates as Tyler Breslin Quarries of Charleston, West Virginia and is producing specification material from hard sandstone at the rate of 450 tons-per-hour with 100 percent crushing.

Heart of the plant is the world's largest overhead eccentric jaw crusher, a PIONEER 4248 with 4 cubic yard crushing chamber. Equipped with self-aligning roller bearings and hydraulic adjusting mechanism, it represents the modern trend in crusher design.

Crusher base is split horizontally for easier handling, and hydraulic pressure grooves in the shaft under the bearing races, make it possible to remove bearings with fingertips. Moving and stationary jaws are in sections which can be

reversed for longer manganese wear.

Double wall, box type construction gives the base added strength and makes it possible to keep total weight of crusher under 95,000 lbs.

The giant crusher is supplied by a 48″ x 16′ PIONEER ORO feeder equipped with massive 5/8″ thick cast manganese steel pans which take the huge loads dumped by the quarry trucks. The feeder pans have integrally cast links and are driven by manganese steel sprockets with renewable teeth.

Both units (crusher and feeder), along with motor mounting, are joined in a single primary plant mounted on 21″ I-beam skids set on a reinforced concrete foundation.

Secondary Unit Has Big Roll Crusher

Completing the all-PIONEER installation is a secondary plant consisting of a 54″ x 24″ roll crusher with one smooth and one corrugated shell, and a 5′ x 12′ Mesabi-type 2-deck gradation screen.

Support for the Mesabi screen, an extra heavy duty unit designed specifically for rugged jobs, is furnished by an extension of the roll crusher base. Three PIONEER conveyors totaling 185′ in length and a storage bin complete the plant.

In operation, material from the primary plant that passes the bottom deck is conveyed directly to the storage bin; oversize from both decks is returned to the roll crusher for further reduction.

Pioneer Helps Select Plant Site

The high-producing Tyler Breslin Quarries turnpike plant shown above was designed by a PIONEER field engineer in close collaboration with the purchaser and his equipment dealer.

This engineer surveyed the site, studied the material and specifications, analyzed the problem, then furnished the details to PIONEER's engineering department which developed the plan shown at the left.

Complete erection prints were provided, and experienced PIONEER assistance was given in the erection of the plant.

But PIONEER's responsibility didn't end when the plant when into operation. Though PIONEER equipment is recognized in the industry as requiring a minimum of upkeep, an alert, worldwide distributor service organization and factory-trained maintenance men are available whenever quick service is needed.

The Pioneer Edge In Action

Couple this service with the creative engineering that has accounted for an impressive list of "firsts" in the design and building of aggregates producing equipment, and you have a combination that's hard to beat. Operators who have seen the performance of PIONEER equipment in the field . . . call it the PIONEER EDGE.

For further details on the turnpike plant and other PIONEER high output, low upkeep crushing and screening installations, write Pioneer Engineering Works, Inc., Minneapolis, Minnesota (subsidiary of Poor & Co., Chicago).

Pioneer
Continuflo EQUIPMENT

New DODGE "Job-Rated" TRUCKS

WITH

NEW! Roomiest Cab! Wide, 3-man cab with easy-chair seat. 951 sq. in. windshield and best all-around visibility of any make.

NEW! Sharpest Turning! 39° turning angle, short wheelbase design for top maneuverability. Easiest handling trucks there are!

NEW! V-8's and Sixes! Most powerful V-8's in popular field—133 to 172 h.p. Plus famous Dodge Sixes. 7 engines in all.

NEW! Low-Built Lines! Built low for better road stability, easier loading, ground-hugging good looks. Lower step for easier cab entry.

ALL ADD UP TO

"A better deal for the man at the wheel"

All-new Dodge trucks offer a better deal in low operating and upkeep costs, too . . . are priced with the lowest. Make it a point to call your friendly Dodge dealer—or drop in to see him soon. You'll like these new trucks!

See "Break The Bank" with Bert Parks on TV (ABC, Sundays).
Hear "The Roy Rogers Show" on radio (NBC, Thursdays).
See "Make Room For Daddy" with Danny Thomas on TV (ABC, Tuesdays).
Enter the Dodge 40th Anniversary All America Contest. See your dealer.

LIGHT IN THE NIGHT...

Spearing across the snows
of Canada shines this headlight.
But for refractory brick,
the arc wouldn't spark to flash
the headlight, the stainless
steel with which the car is built
would not exist... the trucks
she rides on, the motors and the
generators, even the glass...
depend for their existence upon
quality refractories
such as Grefco supplies
the world.

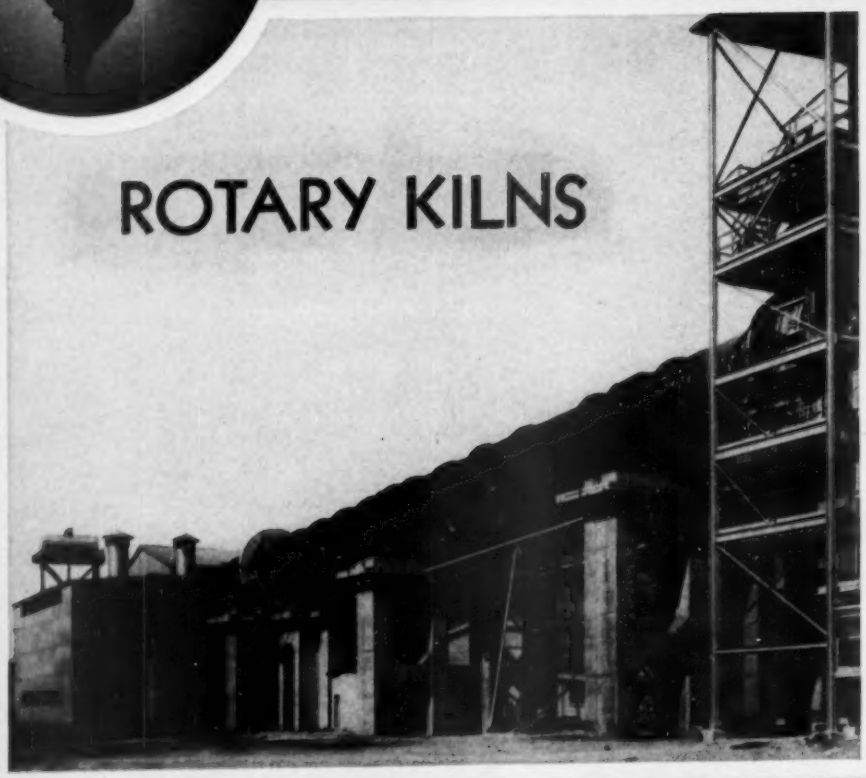
Budd Rail Diesel Car on the Canadian Pacific Railway

GENERAL REFRACTORIES COMPANY

GENERAL
REFRACTORIES
COMPANY
Philadelphia

Products of fame... wherever there's flame

SMIDTH



For Smidth Machinery apply to:

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F. L. Smidth & Co. (Bombay) Ltd.
42 Queen's Road
Bombay, India

WHAT'S HAPPENING

In Other Fields of Interest to Rock Products Industry

March, 1954

To encourage defense industries to join in the atomic bomb shelter construction program, the government has offered a rapid tax write-off program to defer the cost of the construction. The first to take advantage of the offer was said to be the Cincinnati Milling and Machine Co., which is building two shelters to protect its 1300 employes from a possible A-bomb attack. The company reportedly will get a 100 percent tax write-off, over a 5-year period, for construction of two shelters to cost some $550,000. Both will be constructed of reinforced concrete slabs, one to be completely underground the other in the sub-basement of a new building.

* * * * * * * * * *

Heavy construction awards, nationally, totaled $960,620,000 during the first five weeks of 1954, which was a 49 percent decrease from the $1,886,520,000 total for the same period of 1953, as reported by Engineering News-Record. Private contracts, totaling $466,000,000, were 60 percent lower than for the corresponding 1953 period, while federal awards of $96,000,000 showed a 58 percent decline. Volume for both private and federal work was unusually heavy in January, 1953, which accounts in part for the unfavorable comparison. State and municipal awards of $398,000,000 were down 17 percent from the 1953 total.

* * * * * * * * * *

The development of a free-flowing powder, consisting of unvulcanized synthetic rubber and barytes mineral, for use in road construction, has been announced by The Goodyear Tire & Rubber Co. Use in rubber in roads is not new, but most previous paving applications were with vulcanized rubber. The new material, trade-named "Rubarite," reportedly represents the first successful mix with unvulcanized synthetic rubber, and is produced by co-precipitating synthetic rubber latex and finely ground barytes mineral, which serves as a carrying agent for the rubber particles. The principal advantage of using unvulcanized rubber is that it is said to disperse more readily in the asphalt.

* * * * * * * * * *

It is predicted that Canada will lead the United States in the field of prestressed concrete, due to the recent organization of the Prestressed Concrete Development Group of Canada, which plans to promote the safe and orderly use of prestressed concrete in Canada by recommended specifications, courses of instruction and other means. Prestressed concrete reportedly attracted much interest at the recent convention of the Engineering Institute of Canada, and again when the University of Toronto sponsored a prestressed concrete conference for engineers, contractors and other interested persons.

* * * * * * * * * *

According to a recent report in Industrial and Engineering Chemistry, Great Lakes Carbon Corp. plans to build a new city, for a 60,000-70,000 population, near the site of its diatomaceous earth quarry on Palos Verdes peninsula in California; an expenditure of $6,000,000 will initiate the 10-year development project on the 6800-acre tract.

* * * * * * * * * *

Capital expenditures of $1 billion, two-thirds in 1954 and the balance in 1955, were recently announced by Harlow H. Curtice, president, General Motors Corp. It was predicted that the expenditures may be revised upwards to $1.5 billion before the over-all project is completed, in which case, the time period would extend over three years. The corporation already has spent $2 billion in new capital investment since 1946. In making the announcement, Mr. Curtice stated that he believes the "economic pessimists" are mistaken and predicts a continuing strong and healthy national economy. Regarding the automobile industry, the domestic market in 1954 is expected to compare favorably with that of 1953, which was the second largest year for the automobile industry.

WHAT'S HAPPENING

Construction contract awards, in the 37 states east of the Rockies, totaled $17,443,463,000 in 1953, a new all-time high in dollar volume, and 4 percent higher than the 1952 totals, according to an F. W. Dodge Corp. report. Greatest gains were made in heavy engineering awards (public and private works and utilities), which increased 17 percent to a total of $4,008,454,000. Non-residential awards of $6,955,866,000 were up 4 percent over 1952, while residential awards of $6,479,143,000 were down 3 percent. December contract awards of $1,299,800,000 were 7 percent lower than in November, and 11 percent below the December, 1952, figure. Non-residential awards for December, 1953, totaled $540,338,000, down 12 percent from November and 24 percent below December, 1952; residential awards of $433,500,000 decreased 10 percent from November and 1 percent from December, 1952; and heavy engineering awards of $325,926,000 showed a 9 percent increase over November and a 2 percent increase over December, 1952.

* * * * * * * * * *

A consent judgment, ending the government's anti-trust case against 14 Cleveland, Ohio, area dealers in hard building materials, was recently announced by the Attorney General. The suit, filed in May, 1949, charged illegal conspiracy to fix non-competitive prices for such materials as sand, stone, gravel, cement, lime, plaster and brick. Without admitting any of the charges, the defendants in the new judgment agreed not to exchange any information on their prices before publishing them generally to their customers.

* * * * * * * * * *

Stanford Research Institute scientists are conducting research in the field of explosives with the objective of gaining precise control of the destructive impact of such charges, so that they might be put to work for industry, as reported in "The Wall Street Journal." One of the techniques developed is the use of a small amount of strategically placed explosives to cut steel bolts in two, a technique which may be used in the future launching of ships. This technique would also have other industrial applications, when large, rigidly-held loads have to be released suddenly, such as in the demolishing of bridges and buildings. Other uses for controlled explosive charges, which will have possible industrial applications, are being developed at the institute, but cannot as yet be described because of confidential arrangements with research clients.

* * * * * * * * * *

Great Lakes carriers set new shipping records, in most categories in 1953, according to the Lake Carriers Association. Dry bulk cargo, limestone, coal, iron ore and grain, reached a new high of 199,694,820 net tons. The previous high was set in 1951 when 189,750,172 net tons were shipped. Limestone shipments set a new record with 26,999,027 tons. Iron ore and bituminous coal shipments also reached new highs. A total of 333 carriers, owned by 56 companies, were in operation in 1953. This marked another year of decline in the number of ships in use, but highlighted the increased size of newer ships and more intensive mechanization of loading and unloading facilities.

* * * * * * * * * *

Another new use for vermiculite was recently reported in "Vermiculite News," a publication of Zonolite Co., Chicago, Ill. According to the report, vermiculite, used in combination with iron chelates, is helping to save Florida citrus trees suffering from iron deficiency. Chelates are relatively new chemical agents which trap and hold the atoms of a metal in solution and, unlike other iron compounds, they readily give up the metal to the plant when needed. Used as a spray, however, iron chelates burn the leaves and fruit, so vermiculite is used to absorb and hold the chelate solution for easy application. The granular powder is simply applied to the soil around the tree.

* * * * * * * * * *

A new coated ultrafine calcium carbonate, Purecal SC, which is said to solve some dispersion problems for the rubber industry, was recently announced in Chemical Engineering. Made for easy dispersion without special handling, it is said to eliminate master-batching and to give essentially the same properties as those heretofore attributed to the uncoated ultrafine carbonates. Purecal SC's unique coating is believed to be the first offered commercially which does not retard the cure. The manufacturer predicts that the material means better rubber products at less cost and that, using ordinary factory methods, it will open the field to many rubber compounds formerly considered impractical due to handling difficulties.

THE EDITORS

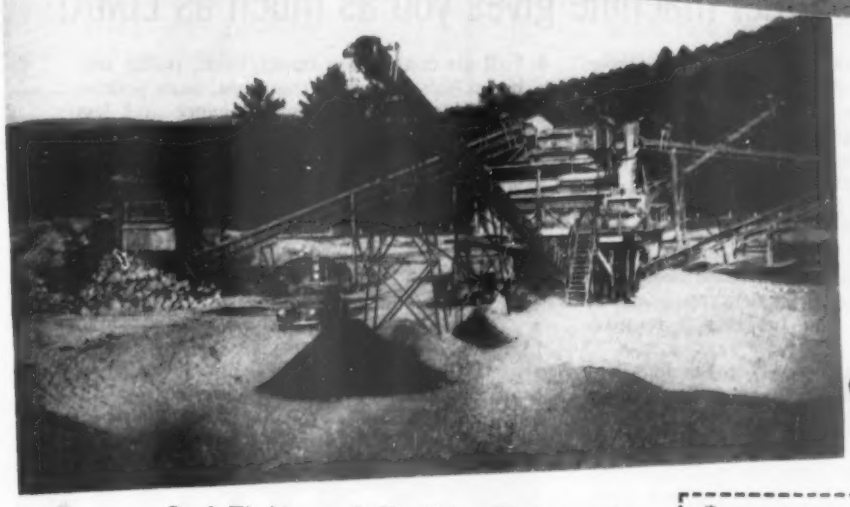
Eagle PROFIT-PROVED AGGREGATE PROCESSING EQUIPMENT

IS "DOING THE JOB" FOR

E. G. DeLia & Sons Construction Co.

NORTHVILLE, N.Y.

Heart of the busy DeLia aggregate processing plant is shown at right—an Eagle Water Scalping Tank with dual compartment collecting-blending flume below it, which feeds retained material to an Eagle Double Screw, long weir Washer-Classifier-Dehydrator. The 20' Water Scalping Tank with dual compartment collecting-blending flume, removes excess water and provides preliminary classification—the Eagle double 24" x 22' screw unit washes the material, retains the desired fines and dehydrates the material.



Eagle Washing and Classifying Equipment at DeLia's plant assures a blend of the required meshes of sand to meet New York State concrete sand specifications. Plant averages 125-tons per hour.

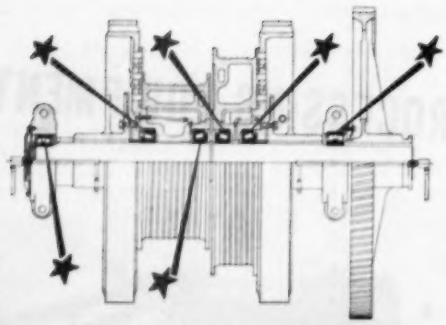
Sand Washing and Classifying Equipment is our business—and has been for a long time. Our experience, based upon hundreds of Eagle installations in all parts of the country, can be of great help to you—no need for any producer to be a "guinea pig"—Eagle has the answers. WRITE FOR LITERATURE.

EAGLE IRON WORKS

LEADERS IN AGGREGATE WASHING AND CLASSIFYING EQUIPMENT FOR HALF A CENTURY
137 HOLCOMB AVENUE
DES MOINES, IOWA

LIMA'S

shafts and drums roll on anti-friction bearings



STARS INDICATE LOCATION OF ANTI-FRICTION BEARINGS IN DRUMS AND PILLOW BLOCKS

As a result of twenty-five years' experience with anti-friction bearings, Lima design engineers know exactly where to put them to give you maximum benefits. This cut away view shows how Lima utilizes anti-friction bearings in the drums. X-ray vision would show you how Lima uses them throughout the main machinery on all shafts and other important parts.

This modern means of eliminating destructive friction benefits LIMA owners through faster operating speeds and lower upkeep. Anti-friction bearings also maintain perfect shaft alignment and insures smoother, easier clutch action.

Two LIMA Type 803 Shovels, equipped with 24' 6" booms, 18' dipper handles, 2½ cu. yd. dippers.

COMPARE! No other machine gives you as much as LIMA!

1. Bronze bushings in tread, idler and drive rollers are protected by piston-type dirt seal rings and retainers.
2. All gears, smaller parts and shafts which are subject to extra wear are flame or induction hardened for longer life.
3. Main machinery is placed well back of center of rotation to eliminate excess counterweight.
4. Anti-friction bearings, used at all important bearing points, reduce destructive friction, fuel consumption and lubrication requirements.
5. Big capacity drums and sheaves lengthen cable life by reducing the need for double wrapping and sharp bends in cable.
6. Full air controls on travel, hoist, swing and boom hoist, result in smoother, more precise operation, minimum maintenance and less operator fatigue.
7. Torque converter (optional) automatically adjusts speed to load requirements, minimizing shock loading, making performance smoother and faster.
8. Wherever you are, you can depend on skilled service and nearby warehouse stocks of parts to keep your LIMA on the job continuously.

COMPARE and you'll specify LIMA for shovels (¾ yd. to 6 yds.), cranes (to 110 tons) and draglines (variable). Smaller capacities available on rubber.

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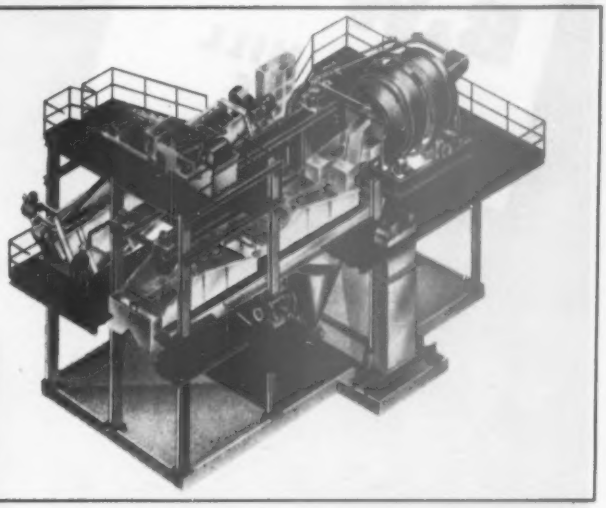

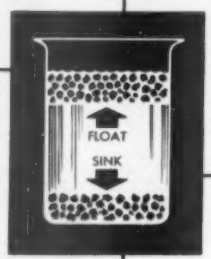

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HMS is a simple sink-float process utilizing differences in specific gravity to float off light, unsound material, leaving hard, sound, premium aggregate. The sink-float principle gives economical and precise control of aggregate quality within limits established by the varying specific gravities of basic constituents.

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Increased demand for high specification aggregates cause **good** commercial deposits to lose value when ordinary upgrading methods fail to meet specifications. HMS processing with WEMCO Mobil-Mills succeeds when other methods fail — the difference between profit and loss.

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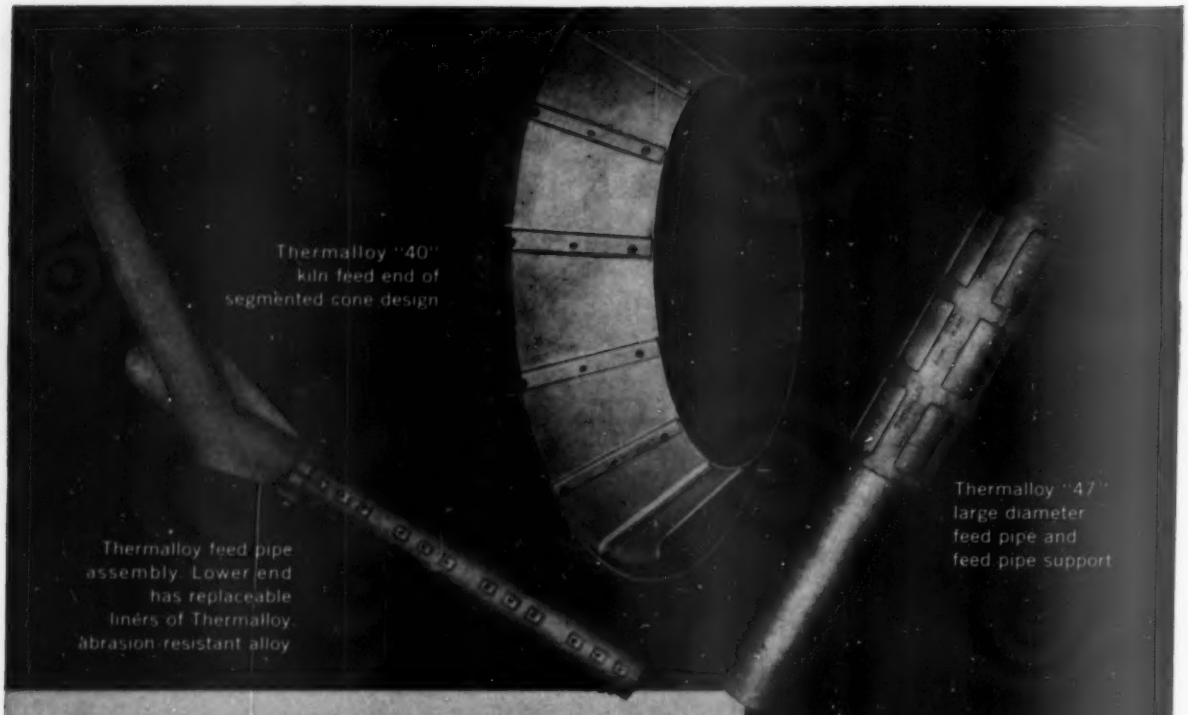
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ALL-STEEL FALK Motoreducers

use *complete* motors with *no* modifications

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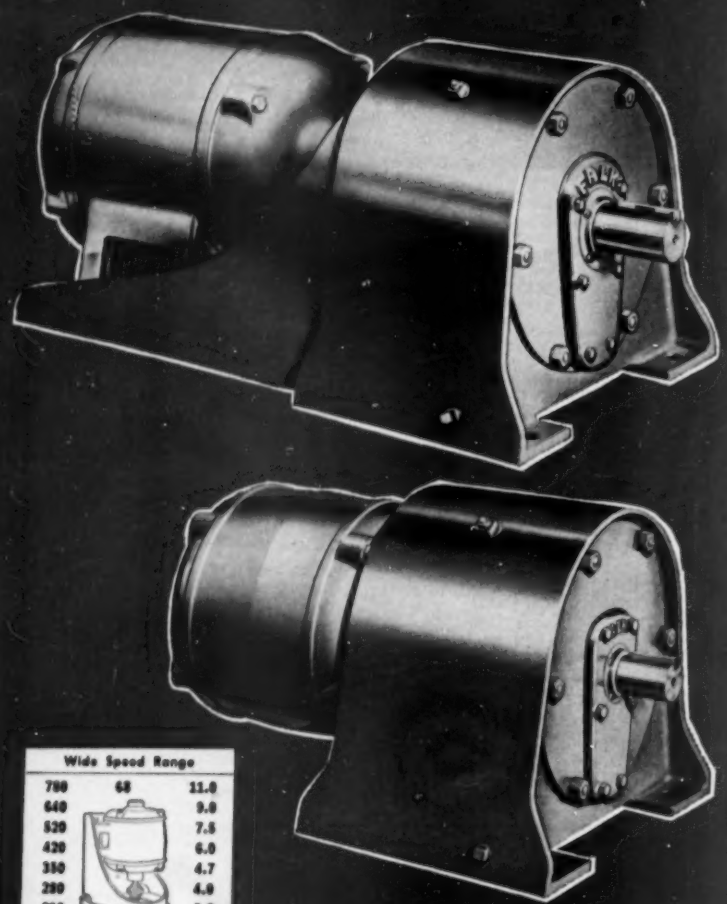
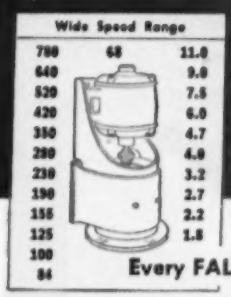


You never have the annoying problem of motor modification when you standardize on *all-steel* FALK Motoreducers. Both the universally popular All-Motor type and the newly redesigned Integral type use *completely standard motors without modification.* The motor can be quickly and easily replaced by another standard motor of any make, type or speed within the unit's AGMA rating when necessary without disturbing the reducing unit.

Many users choose the All-Motor type because it permits easy interchange of motors, *or even parts,* on the job, *in minutes*—and because reducer units and/or motors may be readily transferred from one line or plant location to another. Other users select the new Integral type with standard D-flange NEMA motor because it is a highly compact, streamlined unit providing the utmost in space economy.

In every FALK Motoreducer—All-Motor or Integral—the output speed (ratio) can be changed within the unit's torque capacity without modifying the motor.

Both types give you all the quality, adaptability, dependability and long-range economy for which FALK has been celebrated for more than sixty years. FALK Motoreducers are available from factory, field or distributor stocks throughout the country. Write to Department 247.



Every FALK Motoreducer has these "In-built" Factors—

Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

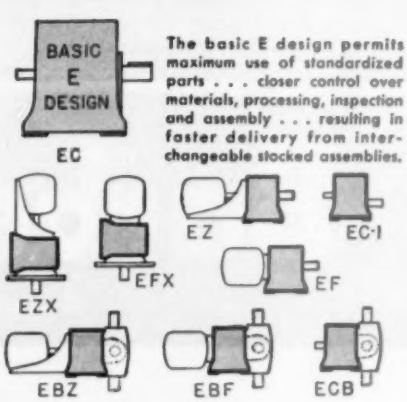
Sealed Housings. Dual closures and one-way vents keep oil in, dust and moisture out. Units are splash-proof, leakproof, dustproof.

Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.



The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.

FALK ...a good name in industry

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The Pattern for Business in 1954

RECENT NATIONAL CONVENTIONS of the rock products and concrete products industries all stressed that producers must roll up their sleeves and go to work to meet intensifying competition for the consumer's dollar in 1954. The emphasis was on product improvement, cost reduction, and better service but, most of all, on the need for exercise of good business management and honest-to-goodness promotion and selling.

Construction requirements continue to be of staggering proportions, and there was optimism reflected at the conventions that volume of business this year would approach the 1953 record-breaker. These predictions assumed that producers would realize that the days of order-taking are over and again become sales-minded. Merchandising will do the trick but the producer will have to go farther than that and contribute his share toward keeping construction going, as part of his responsibility to his community.

The fact that many contractors have already drastically cut their bid prices on building jobs of all sizes not only is exerting price pressure on producers of building materials but the trend, as it continues, may well have bearing on the scheduling of work by the customer, which needs watching.

A buyer's market in construction is definitely here, and there are cases of bid prices running from five to twenty percent lower than a year or two ago, but the construction industry nevertheless expects little dropoff in construction. That industry has expanded so tremendously that competition among its members is bound to increase even with a greater volume of construction.

Contractors' Price-Cutting

Many contractors are moving far afield from their home bases in efforts to get business and, where they may have specialized exclusively in home building or other type, they are turning their attention to commercial building or other fields of new experience. Lack of knowledge of local conditions in unfamiliar territory, and insufficient cost records and pricing experience on the part of many newer contractors have aggravated the price situation further. Irrational bids will undoubtedly force some contractors out of business which should soon ease the price pressures on producers. Producers are concerned but they should be patient and not succumb to widespread price-cutting among themselves.

The downtrend in contractors' bids sets up another challenge to producers, in doing their part, community-wise, to keep construction going. It is only natural for any buyer to hold back his purchases when there is a downtrend in prices. Such a tendency must be resisted by all interested in building, particularly when price declines are the result of an adjustment among contractors.

Sustaining Construction

The small producer has the same opportunity as his bigger competitor to make his influence felt in the commnity. He may not have the knowledge or experience of the big producer in promotion and merchandising but he can acquire much of it through being active in and cooperating with clubs and other organizations in his community which have the prosperity and interest of the community at heart. Certainly, it is to his interest to help those interested groups see to it that needed construction not be held up because of price shakedowns, so that the public be benefited and not suffer unnecessary unemployment.

By helping hold volume of construction up, he has his best opportunity to resist the inroads of competitors. All producers can thus be effective in helping each other rather than resort to price-cutting. The alternative, as has been proved in the past, is to allow construction to lag in anticipation of further reductions in bid prices, with the result that a shake-down period can build up to a localized business recession.

Selling as such must comprise market development and the putting of qualified salesmen to work in the actual promotion of sales and the rendering of service. The effort must penetrate deeply and go far beyond the idea of a first sale to a purchasing agent alone.

Robert F. Porter, vice-president, Harry T. Campbell Sons' Corp., Towson, Md., aptly pointed up the challenge at a meeting of the National Sand and Gravel Association when he said that salesmanship is a profession and that **good old-fashioned hard work** must be behind the philosophy of successful selling. He summed selling up in the following, "there isn't any mystery about selling. Assuming that you have a good value, selling becomes a matter of full and thorough knowledge of your product, full and thorough knowledge of your customer and his needs, and then an intelligent and sincere presentation of the facts to as many genuine prospects as possible."

Bror Nordberg

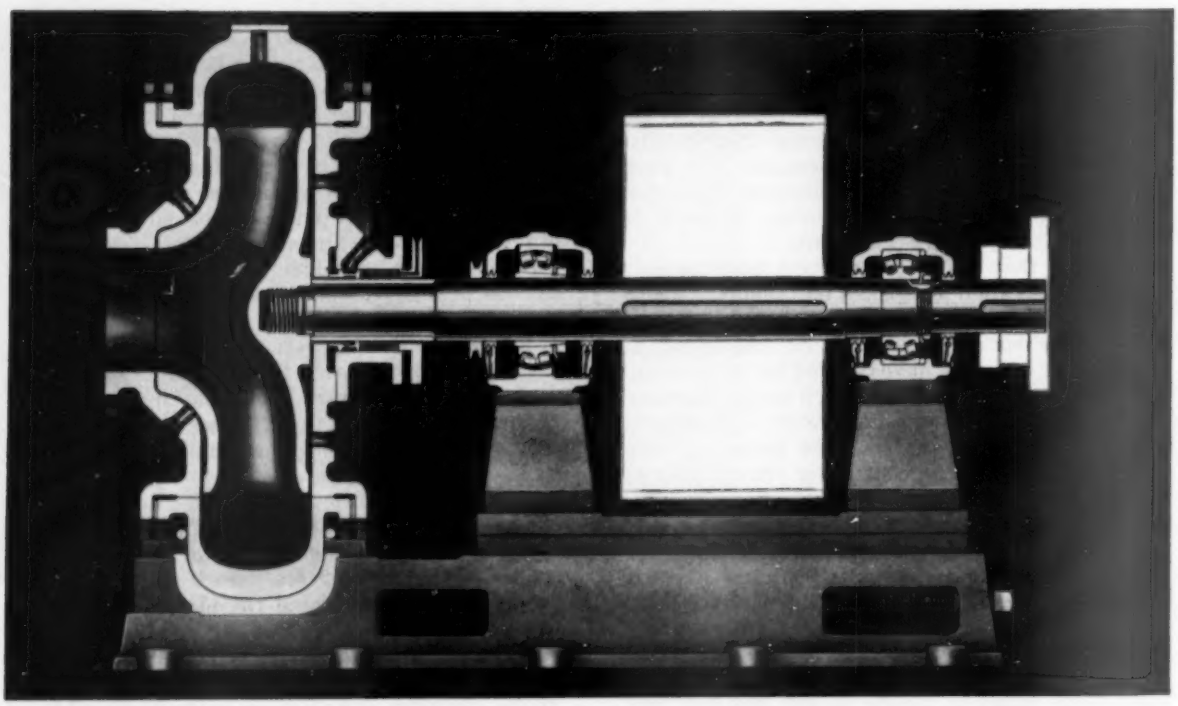
NOW... a manganese steel pump at cast-iron prices

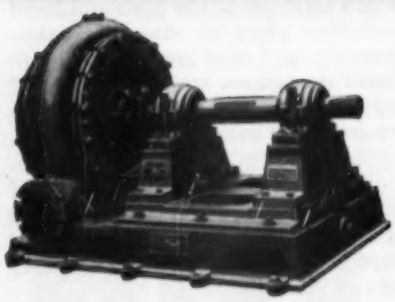
Component for component, this new Amsco manganese steel pump, with spherical roller bearings, is no more costly than a cast-iron pump similarly equipped.

Equally important are the features that have been built into this new pump. It has simplicity of design to hold down maintenance costs. Pump-shaft keyways allow for direct end or center pully connection for power transmission. All water end parts are of cast manganese steel to provide resistance to impact and to give long service life.

Perhaps most important, this new pump incorporates the Amsco "Counter-Flow" principle which increases pumping efficiency and trouble-free operation.

See the new Amsco Model SB-CF before you buy another pump. For information, write Amsco Division, Chicago Heights, Ill.





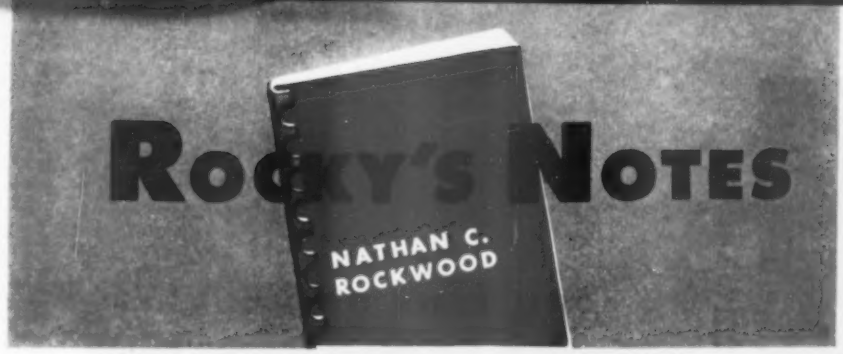
TYPICAL CAPACITY OUTPUT CHART OF 6" MODEL

Capacity GPM	Output with various percentages of solids					
	10%		15%		20%	
	Yds./hr	Tons/hr*	Yds./hr	Tons/hr*	Yds./hr	Tons/hr*
800	24	32	36	48	48	64
1000	30	40	45	60	60	80
1200	36	48	54	72	72	96

*Aggregate assumed to weigh 100 lbs per cu ft

Brake Shoe

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.



Volume Changes in Frozen Cement Paste

WE ARE DELIGHTED to record a new research paper on cement that is so well and capably written that no especial knowledge of modern physical-chemistry is needed for its comprehension; hence, the average engineer-layman—too busy to study new subjects—can readily understand it. The paper we are referring to is "Theory of Volume Changes in Hardened Portland Cement Paste During Freezing," being a reprint from the *Proceedings* of the Highway Research Board, Vol. 32, p. 285 (1953). The authors are T. C. Powers and R. A. Hulmuth, manager of basic research and junior research physicist, respectively, of the Portland Cement Association. This is Research Bulletin No. 46 of the P.C.A., from whom copies may be obtained.

Previous discussions of the effect of air entrainment in preventing rupture of concrete and mortar have been involved in mathematical formulas, which, it is our experience, tend to discourage readership, though with the requisite concentration they actually are not too difficult to follow. This paper is free of mathematical formulas except for the very simple one of thermodynamic relationship between water and ice, when discussing their differences in "free energies." Here one has only to refresh his memory that free energy of any substance is stored-up or potential energy that can be released by a change in environment, such as reduction in temperature and increase in pressure. Entropy is a measure of this free energy, and one needs only to remember that the entropy of a crystal is less than that of a liquid, and that of a liquid less than that of a gas or vapor. Fundamentally, according to present theories of structural chemistry, entropy is a measure of the relative activity or vibrations (agitation) of the atoms or electrons of the atoms composing the substance. A perfect crystal at absolute zero (—273 deg. C.) has zero free energy, the atoms or ions presumably all have fixed positions and can form no new associations. A solid and a liquid *in equilibrium* under conditions of temperature or pressure or both, have each the same free energy—thus ice and water at 0 deg. C.; but in freezing water releases energy in the form of heat or pressure and ice in melting to water absorbs heat or requires outside energy to convert its physical condition from one form to another.

Cement Paste

Perhaps one of the most significant statements is in a footnote (on p. 288 of the *Proceedings*) of the Bulletin, which says that the average diameter of the ultimate hydrated cement particle is now believed to be between 85 and 100 Angstrom units (Å). This is about 0.01 micron. The overall diameter of a silica tetrahedron (SiO_4) is something like 6.5 Å and of a cell of calcium hydroxide [$Ca(OH)_2$] something about the same size. So we have the problem of how many spheres of about 6½ Å in diameter can be packed in a sphere about 90 Å in diameter. This would vary as the cubes of the diameter divided by 6 or as $\frac{6.5^3}{6} : \frac{90^3}{6}$ which means as many times as 46 will go into 121,500 or something like 2800. In other words the ultimate particle of cement gel could contain as many as 2800 "ultimate" particles of silica (SiO_4) and of calcium hydroxide [$Ca(OH)_2$] if they were closely packed. Were we to add an equal number of "ultimate" particles (molecules) of water, which have a diameter approximately one-half that of a silica tetrahedron, we would still have better than 2000 particles of silica and calcium hydroxide with about an equal number of water molecules. Thus some idea may be had of the relative size of an ultimate particle of hydrated calcium silicate, and those of its components. It would appear then that we are a long way from being able to determine the structure of this ultimate particle of hydrated cement.

The character of the agglomerated cement gel is logically explained by the authors of this Bulletin as consisting of groups of these gel particles (spheres), stuck together by bonds of as yet unknown type and strength, but with random cavities which are termed capillary pores or capillary cavities. The interstitial spaces between the packed gel spheres (the ultimate particles of cement gel) are also presumably filled with water, but these spaces are so small compared to the capillary pores, that the water in them is not ordinary water, as explained in our own discussions in the August and January issues in the series of articles on "Prospective Chemistry of Cement and Concrete," and elsewhere in our Notes pages in reviewing research work on clays. The authors of this Bulletin say this interstitial "gel water" could not be frozen at any temperature above —78 deg. C. The capillary cavities are very large in comparison with the interstitial gel spaces, or channels, but of minute size in comparison with the air-bubble pockets resulting from air entrainment. There may be also, of course, "water of constitution" in the constituents of the gel itself.

Mechanism for Extracting Water

The authors' theory for extracting the water from the cement gel, and transferring it temporarily to the entrained-air pockets, is logical and remarkably simple as explained in the text. By freezing the water in the capillary pores of the paste, some water is pushed by pressure of the expanding ice into the entrained-air pockets, and water is withdrawn from the interstitial pores of the gel by thermodynamic forces which are simply explained, thus adding to the ice crystals in the larger capillary cavities and directly or indirectly to the ice in the entrained-air pockets, where by virtue of their size, ice formation is harmless. By this theory or reasoning the gel should actually be improved, because any process that extracts gel water, obviously is a highly desirable process. The authors say that when the freezing is over, and the paste thaws, the water returns to where it came from—into the cement gel interstitial pores and the capillary cavities.

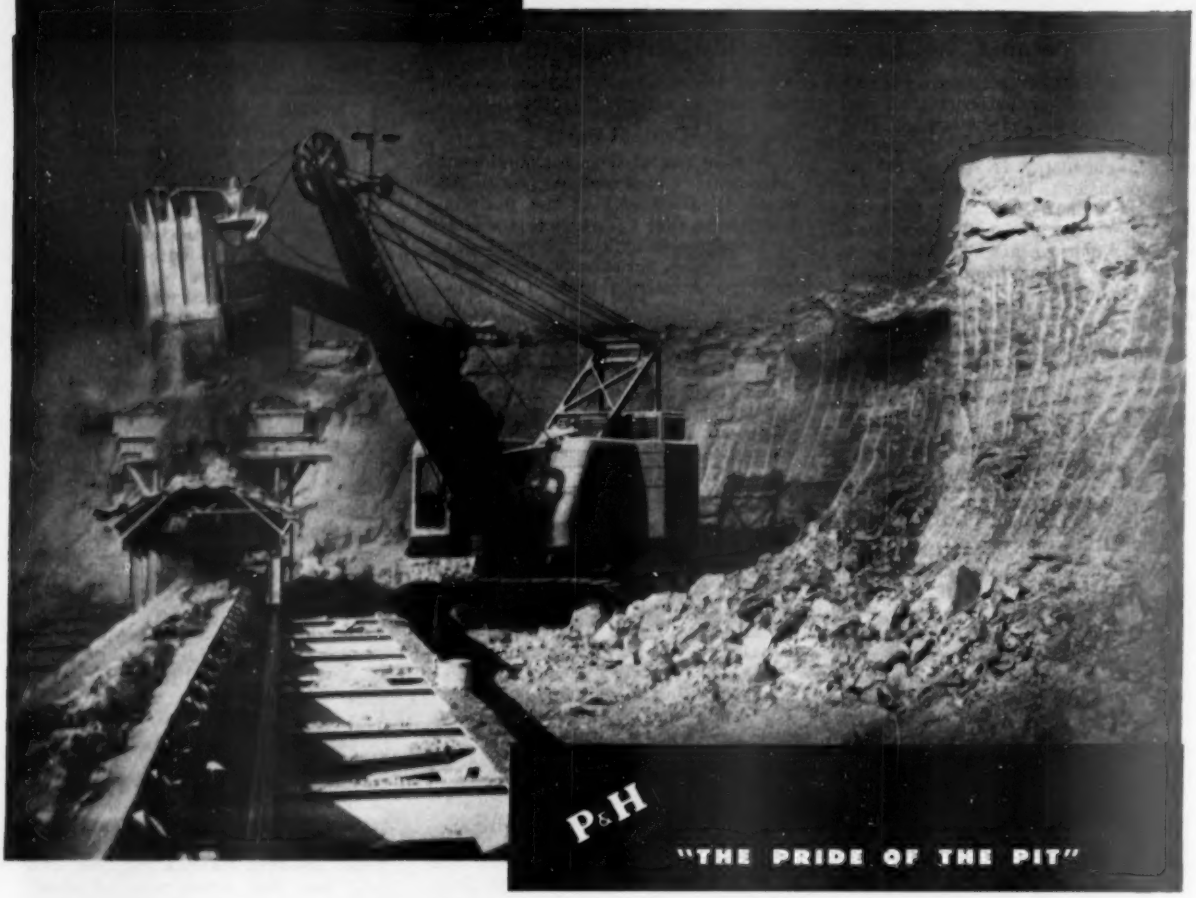
This brings up a point we should like to see developed more in detail, for there is a possibility that all the water thus extracted from the gel does not go back into the interstitial pores by simple adsorption. It could be, as it looks to us, that the paste may be permanently benefited by loss of this water. Our memory goes back to a paper read to a meeting of the American Concrete Institute many years ago by a Russian engineer who said that they never worried about placing concrete in sub-zero weather; that if it froze before the gel hardened it seemed to improve the concrete. Nobody at the time appeared to take his remarks seriously, but in the light of these experiments in freezing cement paste described in this report, it may be that the Russian had something. Also, we are reminded of the experiments made in the National Sand and Gravel Association laboratory in drying and resaturating chert gravel particles. It was found nearly impossible to resaturate the chert to the degree originally present, after most of the water had been dried out, except by submersion in a vacuum. Apparently, the interstitial pores or channels, between the "ultimate" particles of SiO_2 in the case of chert had permanently shrunk, or at least lost part of their ability to bond water molecules.

Possibly the good effects of air-en-

(Continued on page 130)

SULPHUR

500 long tons an hour!



Here at the Freeport Sulphur Company in Louisiana, three P&H 3½-yd. Electric Shovels work an average of 18 hours a day to handle the entire output of the Grande Escaille Mine. 500 tons of sulphur are loaded every hour by each of the three P&H 3½-yd. shovels.

Why does Freeport go P&H? One big reason is that only P&H Magnetorque* eliminates both friction clutches and DC commutators . . . big maintenance headaches anywhere, especially where corrosive atmospheres exist. And, electrical equipment is designed throughout for shovel service — *not adapted for it.* That's another important factor that means lower tonnage costs in any kind of open pit work.

We have many interesting facts about low-cost production in your type of work . . . facts that will explain why every third P&H Electric Shovel sold is a repeat order. Write us.

*T.M. of Harnischfeger Corporation for electro-magnetic type coupling.

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the P&H Line

LABOR RELATIONS TRENDS

Union Power to Discipline Members Limited

By NATHAN C. ROCKWOOD

WE ARE WITNESSING the greatest power in popular government—the power of public opinion—turning against the excesses of labor-union bosses just as a generation ago it turned against autocratic bosses of industry and finance. The most recent but, of course, indirect evidence of this trend is a decision of the Supreme Court of the United States which denies the right of labor unions to discipline their unenthusiastic members for the obvious purpose of throwing fear into them to keep them in line. The decision involved three separate cases in which there were conflicting opinions in the lower courts on very much the same issues. One of these cases was that of the National Labor Relations Board v. International Brotherhood of Teamsters, Chauffeurs, Warehousemen & Helpers of America. Since this is one of the unions our readers have considerable to do with, they may have encountered similar situations; anyhow they may be able to avoid similar ones in the future by knowing the law.

The particular issue in this case was discrimination by the employer in reducing the seniority of an employe at the instigation of the union because the employe was a few days delinquent in payment of his monthly union dues. In this particular case the union had not yet obtained a union-security contract, but that was a minor point and its action would have been illegal even if it had had such a contract, as a decision in the other two cases showed. Upon the basis of a charge filed by the injured truck driver, the general counsel of the N.L.R.B. issued a complaint against the union alleging violation of paragraphs 8(b) 1(A) and 8(b) (2) of the National Labor Relations Act by causing the employer to discriminate against the truck driver by reducing his seniority standing because of his delinquency in paying his union dues. The dues were on a monthly basis, payable the first day of the month and became delinquent on the second day of the following month, under the union bylaws. The bylaws of the union further provided that any member delinquent in dues must forfeit all seniority rights. The truck driver was three days delinquent in payment of his June, 1950 dues.

On July 15, when the union submitted its new seniority list, this member was reduced from 18th on the list to the bottom, 54th. As a result the unfortunate driver was denied driving assignments he would otherwise have had. The collective bargaining contract of the union with the employer had established a seniority system under which the union was to furnish periodically to the employer a seniority list and it was provided that "any controversy over the seniority standing of any employe on this list shall be referred to the union for settlement." The employer was therefore at the mercy of the union bosses and was compelled apparently to do this injustice to this driver.

Law's Provisions

To refresh the memories of our readers we give the paragraphs and sections of the National Labor Relations Act (the ones the union violated): Section 8(b) 1(A) makes it an unfair labor practice for a union "to restrain or coerce employes in the exercise of rights guaranteed in section 157 of this Title." Section 157 provides: "Employes shall have the right to self organization, to form, join, or assist labor organizations, to bargain collectively through representatives of their own choosing, and to engage in other concerted activities for the purpose of collective bargaining or other mutual aid or protection, and shall also have the right to refrain from any or all of such activities except to the extent that such right may be affected by an agreement requiring membership in a labor organization as a condition of employment as authorized in section 8(a) (3)."

Section 8(b) (2) reads: "(b) It shall be an unfair labor practice for a labor organization or its agents—

* * *

"(2) to cause or attempt to cause an employer to discriminate against an employe in violation of subsection (a) (3) or to discriminate against an employe with respect to whom membership in such organization has been denied or terminated on some ground other than his failure to tender the periodic dues and the initiation fees uniformly required as a condition of acquiring or retaining membership; . . ."

N.L.R.B. Counsel Acts

Upon the facts a majority of the N.L.R.B. found that the union had violated paragraphs 8(b) (1) (A) and 8(b) (2) of the Act. As to the former, the Board held that the union's reduction of this driver's seniority restrained and coerced him in the exercise of his right to refrain from assisting a labor organization guaranteed by paragraph 7. The Board held that, "absent a valid contractual union security provision, the driver had the absolute projected right under the Act to determine how he would handle his union affairs without risking any impairment of his employment rights and that the union had no right at any time whether the driver was a member or not a member to make his employment status to any degree conditional upon the payment of dues. . . ." As to the latter, the Board concluded that the union had caused the company to discriminate against the driver and adopted the Trial Examiner's finding that "the normal effect of the discrimination against this driver was to encourage nonmembers to join the union, as well as members to retain their good standing in the union, a potent organization whose assistance is to be sought and whose opposition is to be avoided.

"The employer's conduct tended to encourage membership in the union. Its discrimination against this driver had the further effect of enforcing rules prescribed by the union, thereby strengthening the union in its control over its members and its dealings with their employers and was thus calculated to encourage all members to retain their membership in good standing either through fear of the consequences of losing membership or seniority privileges or through hope of advantages in staying in. . . ."

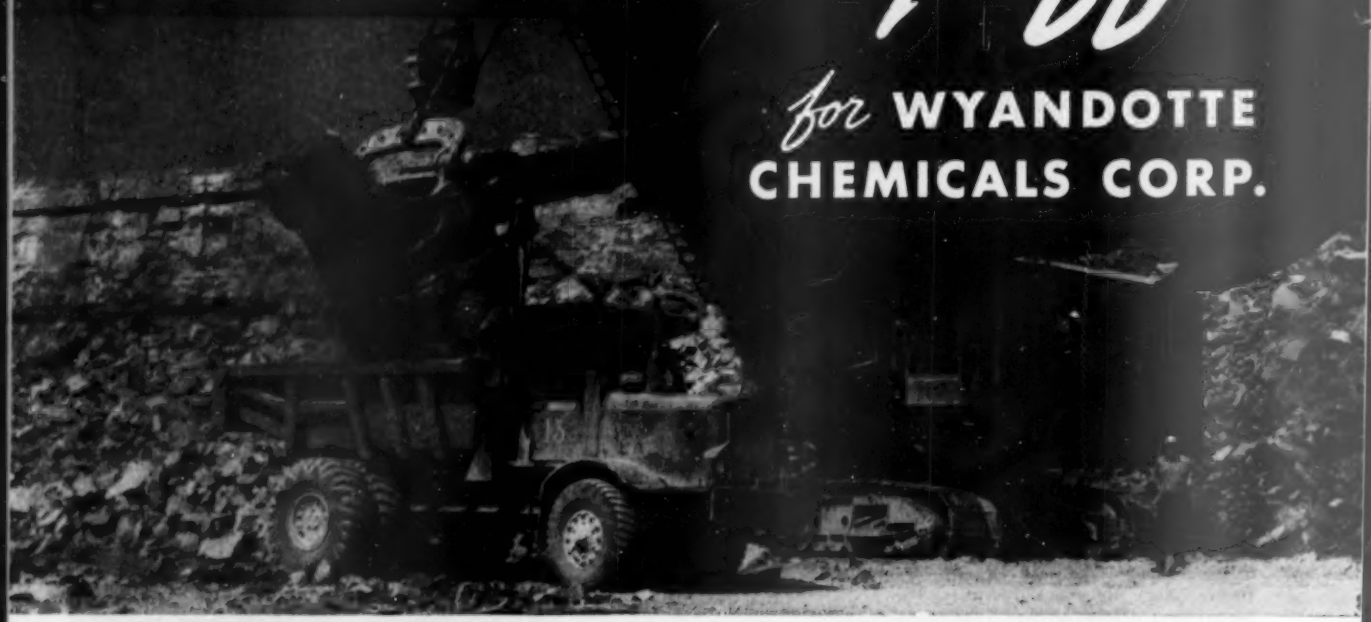
The Board entered an order requiring the union to cease and desist from the unfair labor practices found and from related conduct; to notify the injured driver and the company that the union withdraws its request for the reduction of his seniority and that it requests the company to offer to restore him to his former status; to make him whole for any losses of pay resulting from the discrimination; and to post appropriate notices of compliance.

The Court of Appeals for the Eighth Circuit denied the Board's petition to enforce its order. The court held that "the evidence here abundantly supports the finding of the Board that the respondent caused or attempted to cause the employer to discriminate against this driver in regard to 'tenure . . . or condition of employment,'" but "discrimination alone is not sufficient" and "we can find no substantial evidence to support the conclusion that the discrimination . . . did or would encourage or discourage membership in any labor organization." This conclusion was reached because "the testimony of the driver himself . . . shows clearly that this act neither encouraged nor discouraged his adhesion to mem-

(Continued on page 126)

"Eucs" Pay Off

for WYANDOTTE CHEMICALS CORP.



22,000 hours...still going strong!

At Alpena, Michigan, Wyandotte Chemicals Corp. operates one of the world's largest limestone quarries—another job where "Eucs" are paying off in more loads per hour at less operating and maintenance cost.

Seven years ago Rear-Dump Euclids of 22-ton capacity replaced an electric haulage system for moving rock from the quarry face to the plant. Loaded with stone by shovels of 5 and 6 cu. yd. capacity, and hauling overburden during the winter months, these fourteen "Eucs" have worked an average of 22,000 hours each. On a two mile round trip haul, each "Euc" delivers approximately 75 tons per hour for a total of more than 3 million ton-miles per unit.

Wyandotte standardized on Rear-Dump Euclids because of their job proved dependability on hundreds of mine and quarry operations. Performance records prove this decision has paid off because "Euc" speed, capacity and efficiency have increased production and lowered hauling costs at Alpena.

Your nearby Euclid distributor will be glad to discuss your off-the-road hauling problems and show you how and why "Eucs" can do a better job for you.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

PEOPLE in the news

Heads Ohio Association

WILLIAM A. RODGERS, Chillicothe, Ohio, division manager of Basic Construction Materials division of New York Coal Sales Co., Columbus, Ohio, has been elected president of the Ohio Concrete Block Association, Inc. Sam C. Davis, manager, Snyder Concrete Products Co., was elected first vice-president; O. H. Seeger, general manager, Harry Wellnitz Co., Columbus, second vice-president; and T. L. Goudvis, president, Concrete Masonry Corp., Elyria, treasurer. New trustees are George B. Eichenlaub, secretary-treasurer of the King-Eichenlaub Co.; J. Paul Batterson, vice-president of the Cunard-Lang Concrete Co.; R. Neil Christy, vice-president of Marietta Concrete Corp., Marietta; and G. H. Brunk, secretary-treasurer of the Buckeye Cement Products Co., Springfield. Holdover trustees are R. E. Francis, president, Reading Concrete Products, Inc., Cincinnati; retiring president, Robert W. Geist, Geist Block and Supply Co., Piqua; H. J. Schmitz, president, Cement Products, Inc., Mansfield; and E. E. Osborn, sales manager, Clinton Construction Co., Wilmington.

Mr. Rodgers named the following committee chairmen: O. H. Seeger, technical problems; J. Paul Batterson, labor relations; E. E. Osborn, finance; H. J. Schmitz, membership; Harry P. Clegg, Jr., public relations; Dan G. Newton, legislative, and Frank D. Snyder, resolutions.

Vice-President Resigns

H. C. MAGINN has resigned as executive vice-president of Calaveras Cement Co., San Francisco, Calif., to devote full time to his new position as president of the Blair Holding Corp., but will continue to serve on the board of directors of Calaveras. Arnold M. Ross, Mel J. London and E. M. Barker, vice-presidents, have been appointed to the management committee. Gardner W. Mein has been named as alternate member of the committee.

Plant Manager

RICHARD G. TARBELL has been named manager of the Fort Dodge, Iowa plant of National Gypsum Co., Buffalo, N.Y. He succeeds H. J. Marsham who has retired after 18 years of service with the company. Mr. Tarbell has been with the company for 15 years. A native of Kenmore, N.Y., he attended the University of Michigan, Ann Arbor, Mich., where he graduated from engineering school in 1939. He joined the laboratory of the Savannah, Ga., plant of National Gypsum Co., later transferring to the Baltimore, Md., branch as board plant superintendent. He was appointed assistant manager at Fort Dodge about four and one-half years ago.

Mr. Marsham has had 34 years of experience in the gypsum industry. He was associated with the Phoenix Gypsum Co., Wheatville, N.Y., for two years, then transferred to Noble's gypsum plant at Akron N.Y., which later became a branch of the University Gypsum Co., which in turn was bought by the National Gypsum Co. in 1936. He was appointed manager of the Fort Dodge plant in 1944.

Research Director Retires

LESTER C. HAWK, research director, Penn-Dixie Cement Corp., Nazareth, Penn., has retired after 44 years of service with Penn-Dixie and predecessor companies. He is a graduate of Lafayette College, Easton, Penn., where he also took post graduate work in chemistry. He joined the Dexter Portland Cement Co. in 1909, where he was chief chemist until 1926, when he became chief chemist of the northern division of Penn-Dixie Cement Corp. He was appointed research director in 1949.

Lester C. Hawk

Officers Re-elected

R. L. MILNER has been re-elected president of Pumice, Inc., Idaho Falls, Idaho. Robert E. Lee, Twin Falls, was re-elected secretary, and C. G. Wyllie, Twin Falls, treasurer. R. Neal McDonald, Salt Lake City, a recent investor in Pumice, Inc., was named vice-president.

Warner Appointments

J. GILMORE WILSON, formerly general superintendent of the Cedar Hollow plant of Warner Co., Philadelphia, Penn., has been appointed chief design engineer. Joseph O. Sherod has been named chief industrial engineer to head the newly created industrial engineering department. He was formerly assistant to H. J. Whitten, vice-president in charge of the lime division. Horace L. Woodland, formerly superintendent, has been appointed plant manager at Cedar Hollow to take the place of J. Gilmore Wilson.

J. Gilmore Wilson

Mr. Wilson, a graduate of Lafayette College, Easton, Penn., with a degree in engineering, joined the company in 1920 as an engineer and in 1929 was appointed general superin-

Joseph O. Sherod

Horace L. Woodland

tendent of the Cedar Hollow plant.

Mr. Sherod joined Warner Co. in 1952 as manager of the magnesium oxide plant at Cedar Hollow. When the plant closed he was appointed assistant to H. J. Whitten. He is a graduate engineer from the University of Iowa.

Mr. Woodland joined the company as a clerk at McCoy plant in 1915, subsequently becoming chief clerk. In 1945 he was made superintendent of the plant. Four years later he was transferred to Cedar Hollow as superintendent.

Huron Appointments

WILLIAM G. MACDONALD has been appointed manager of the Alpena mill of Huron Portland Cement Co., Detroit, Mich. He succeeds Clinton P. Harris, who has retired but will continue in active service on the mill staff as consulting engineer. He will also continue to represent the company on the Accident Prevention Committee of the Portland Cement Association. Mr. MacDonald was formerly assistant mill manager and will be succeeded by Osborn R. Archer, assistant superintendent of distributing plants and vessels. Elmer H. Evans, who has been serving as assistant superintendent of production, has been appointed superintendent at Alpena. Ralph E. Simmons has been made assistant superintendent of personnel at the mill.

Administrative Assistant

R. W. LAWSON, general manager of the Consolidated Feldspar department of the industrial minerals division of International Minerals and Chemical Corp., Chicago, Ill., has been appointed administrative assistant to Norman J. Dunbeck, vice-president in charge of the division. Mr. Lawson has had 40 years of experience in the industry and had a major part in building the Consolidated Feldspar Corp., which was acquired by International in 1952. E. W. Koenig, who has been technical director of the department and has been associated with Consolidated for 24 years, succeeds Mr. Lawson as general manager. W. Branch Lawson has been appointed assistant manager. He has been in charge of land acquisition and personnel. Charles E. Hunter, geologist, has been named production manager, succeeding Ed Boone, who continues in an advisory and consulting capacity. Thomas T. Lawson, superintendent at Kona, N. C., has been appointed assistant production manager.

Personnel Director

WILLIAM BITTER, JR., has been appointed personnel director of Maule Industries, Inc., Fort Lauderdale, Fla. He was formerly analyst of job evaluation and salary administration for Eastern Airlines. Thomas D. Blakely has been named fleet superintendent and will be in charge of more than 400 pieces of automotive equipment, also eight repair and maintenance shops. He was formerly fleet superintendent for National Brands, Miami, Fla.

Advertising Manager

L. F. LAWRENCE has been appointed advertising manager of Lehigh Portland Cement Co., Allentown, Penn.

William F. Atkins

Elected Vice-President

WILLIAM F. ATKINS has been elected vice-president and sales manager of Lehigh Materials Co., Lansford, Penn., producers of Lelite lightweight aggregate. A native of Schenectady, N.Y., he was formerly a manufacturing agent in brick, tile and masonry units at Erie, Penn., and has been active in research work for lightweight construction materials. Mr. Atkins is a member of the National Concrete Masonry Association, American Society for Testing Materials, and American Concrete Institute.

Re-elected President

GEORGE W. KATTERJOHN, president, Katterjohn Concrete Products, Paducah, Ky., was re-elected president of the Southeastern Region of the National Concrete Masonry Association at its recent meeting in Charleston, S. C. W. R. Ireland, president, Atlanta Aggregate Co., Atlanta, Ga., was re-elected secretary-treasurer. New directors are Sam Bailey, Jackson Stone Co., Jackson, Miss.; Henry Pommer, John A. Denie's Sons Co., Memphis, Tenn.; and Robert H. Radcliff, Jr., Radcliff Gravel Co., Inc., Mobile, Ala.

Left to right: William G. MacDonald, Clinton P. Harris, Osborn R. Archer, Elmer H. Evans, and Ralph E. Simmons

Elected President

GEORGE W. GARRETT has been elected president of the Stewart Sand and Material Co., Kansas City, Mo., to succeed John Prince, who has been named chairman of the board. Mr. Garrett was formerly general manager and executive vice-president. William J. Stewart, formerly sales manager, has been elected vice-president.

On Board of Engineers

C. M. HOWARD has been appointed by Gov. Arthur B. Langlie of Washington to a five-year term on the State Board of Registration for Professional Engineers and Land Surveyors. He succeeds H. K. Benson, whose term has expired. Prior to his appointment, Mr. Howard served for 24 years as engineer-manager of the Concrete Products Association of Washington, Seattle, Wash.

Named Superintendent

F. E. STEARMAN has been named plant superintendent of the Union Rock and Materials Co., Phoenix, Ariz., to succeed John S. Parker, who has been transferred to Casa Grande as manager of the Bentson Contracting Co., Inc., an affiliate. A graduate of Northwestern University, Evanston, Ill., Mr. Stearman has been a resident of Arizona since 1926.

Elected Vice-President

THOMAS E. STUMM has been elected vice-president of Consumers Co., Chicago, Ill., producers of crushed stone and sand and gravel.

Universal Appointments

JAMES T. MAHER has been appointed assistant to Albert O. Stark, vice-president of sales in the eastern and southern region of Universal Atlas Cement Co., New York, N.Y. He was

James T. Maher

Horace R. Wemple, Jr.

formerly assistant sales manager of the New York sales territory. Horace R. Wemple, Jr., who joined the company in 1942 as industrial engineer in the operating department, has been named chief industrial engineer.

Elected Vice-President

FRED B. HUNT has been named vice-president of the Dewey Portland Cement Co., Kansas City, Mo., and placed in charge of both the Dewey, Okla., and Davenport, Iowa, plants. He will make his headquarters in Kansas City. Mr. Hunt was formerly works progress manager at the Dewey plant and will be succeeded in this position by E. S. Ernst, chief chemist and assistant works manager at the Davenport plant.

Chief Engineer

JOHN R. HILL, JR., has been promoted to chief engineer of Gifford-Hill & Co., Inc., Dallas, Texas. He succeeds J. W. Higgs who passed away recently.

General Manager

MILES T. EPLING has been appointed general manager of M. T. Epling Co., Gallipolis, Ohio, replacing Mrs. Hortense A. Epling.

OBITUARIES

HOWARD T. REX, president of the Woodville Lime Products Co., Toledo, Ohio, and the Superior Products Co., Detroit, Mich., died unexpectedly January 28 in Florida following an emergency operation. A resident of Algonac, Mich., Mr. Rex and his wife had been living recently at their winter home at Del Ray Beach, Fla. A native of Toledo, Ohio, Mr. Rex was associated with his brother, John P. Rex, in the Rex Clay Products Co., Detroit, for several years. Later, he formed the Superior Products Co. in Detroit. He became head of the Woodville Lime Products Co. more than 10 years ago.

WILLIAM G. BRUNS, founder and president of the Eagle Sand and Gravel Co., Sioux Falls, S. D., died suddenly on December 30. He was 69 years old. Mr. Bruns also founded the Bruns Construction Co. which has been operated by his son, William G. Bruns, Jr., since the end of World War II.

WILLIAM EMMET LINN, formerly a manufacturer of concrete block in Akron, Ohio, died January 28 at the age of 75. He had been ill for three years.

REX S. BAIRD, assistant general superintendent of operations of the Cottonwood Heights plant of Utah Sand and Gravel Products Corp., Salt Lake City, Utah, died January 28 after an illness of a few days. He was 44 years of age.

MILTON CALVIN ROBINSON, owner of the Robinson Supply Co., Ashtabula, Ohio, manufacturer of concrete block, and owner of the M. C. Robinson Coal and Building Supply Co., Conneaut, Ohio, passed away recently after a long illness. He was 86 years old.

FRED MYERS, retired concrete block manufacturer, Kent, Ohio, died January 18 at the age of 77.

WILLIAM H. YERKES, retired owner of the old Lukens and Yerkes quarry at Black Horse, Penn., passed away recently at his home in Norristown. He was 96 years old.

W. N. THORNTON, secretary-treasurer of the Garrett Construction Co., Springfield, Ill., died suddenly on January 6. He had not been ill and appeared to be in good health at the time he and Mrs. Thornton attended the annual meeting of the Missouri Limestone Producers Association held on December 6 in Jefferson City.

JOHN C. BOWEN, executive vice-president and director of Lehigh Portland Cement Co., Allentown, Penn., died suddenly on January 19 in his New York City apartment where he and Mrs. Bowen had spent the night.

FRANK J. GANKLER, SR., vice-president and general counsel for Fischer Lime and Cement Co., Memphis, Tenn., died January 3 after a long illness.

JOHN J. GUERIN, former general superintendent of the Sandusky, Ohio, plant of The Kelley Island and Transport Co., Cleveland, Ohio, died February 8. He was 75 years of age.

GUY SCOTT LAFORGE, retired superintendent of the Union Bridge, Md., plant of Lehigh Portland Cement Co., Allentown, Penn., died February 10 at the age of 75. He had retired in 1946.

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THE RIGHT ANSWER IS: that member of the *Texaco Ursa Oil* series specifically recommended for your engines and their operating conditions. You can have no better assurance of clean, top-notch performance and rock-bottom maintenance costs.

The famous *Texaco Ursa Oil* series is a complete line of diesel and heavy duty gasoline engine lubricants especially refined to make engines give *more power* with *less fuel* over *longer periods* between overhauls. Thus, whatever the type, size or speed of engine, or fuel used, there is a member of the *Texaco Ursa Oil* series exactly suited to your operation—assuring maximum performance at minimum cost.

For hydraulic mechanisms, use *Texaco Regal Oil (R & O)*. It keeps systems free from sludge, rust and foam—assures smooth, trouble-free performance, longer pump and parts life. On open gears and wire rope, use *Texaco Crater*. It assures smoother operation, increases gear life . . . keeps wire rope strong longer.

Learn how Texaco can increase equipment efficiency and reduce maintenance costs. Just call a Texaco Lubrication Engineer at the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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industry news

Cover Picture

ON THE COVER of this issue is an overall view of the Rhodes & Jamieson, Ltd., sand and gravel plant at Centerville, Calif. This company, with general offices in Oakland, is also a very important distributor of building materials and producer of ready-mixed concrete with plants in Oakland, San Leandro, Almond Road Reservoir, in addition to Centerville.

The illustration shows a DW20 Caterpillar diesel tractor and No. 20 scraper combination which is used to haul sand and gravel from the pit to the plant for processing.

Gravel Plant Expansion

COOLEY GRAVEL CO., Denver, Colo., is doubling its present operations with the construction of a new floating-type gravel plant at South Denver, which will have a capacity of 300 t.p.h. The new plant will be equipped with crushing equipment to reduce ⅜- x ⅛-in. material to sand. According to the company, a large percentage of this material would otherwise be wasted. The crushing cost reportedly will be considerably less than the average plant operation cost.

The plant's present capacity allows only for the production of standard concrete aggregate. The new facilities will provide for the production of plaster and brick sand, engine sand, roofing gravel, asphalt materials, road-surface gravel and filter gravel.

Sand and Gravel Plant

OWENS BROS. CONSTRUCTION CO., New Smyrna Beach, Fla., recently announced the addition of a new sand-washing plant to its present facilities. The company was recently incorporated, with the following officers: William E. Owens, president; John R. Owens, vice-president and secretary; and Mrs. Lillie W. Osgood, treasurer.

Dravo Scholarship Program

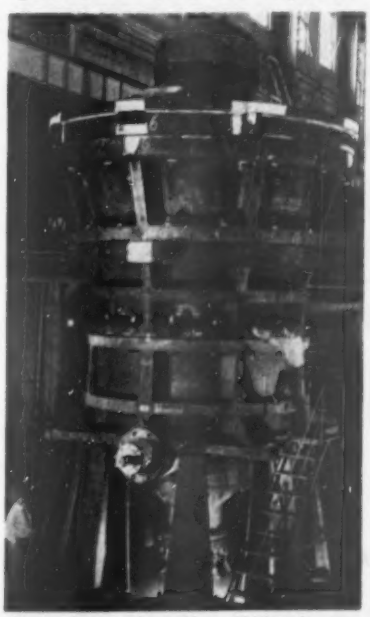
DRAVO CORP., Pittsburgh, Penn., has announced the establishment of an annual $12,000 scholarship program for three Pennsylvania colleges and one out-of-state college to be named later. The three Pennsylvania colleges are Carnegie Institute of Technology, Lehigh University and the University of Pittsburgh. Scholarships at the latter college will be in business administration, while those at the others will be in engineering.

The program provides for two upper-division scholarships of $1500 in each of the schools. Of this amount, $1000 will go to each recipient for tuition, books and other expenses, while $500 will go to each institution's general fund. This will make a total of eight scholarships to be awarded annually. The program is administered by a Dravo Corp. scholarship committee, headed by A. W. Dann, executive vice-president, working in cooperation with a faculty committee in each college.

Limestone Quarry

THE NEW LIMESTONE QUARRY and plant at Presque Isle, Mich., owned jointly by five major steel companies, is expected to be ready by mid-1954, and will be operated for the steel companies by The Kelley Island Lime and Transport Co., Cleveland, Ohio.

Major equipment to be installed at the plant includes a 60-89 "Superior" gyratory crusher, supplied by Allis-Chalmers Manufacturing Co. This crusher, said to be one of the largest ever built by the company, has an 1800- to 2200-t.p.h. capacity; an 8- to 9-in. setting on the open side; and a 1½-in. throw. It is equipped with a "push-button" controlled "Hydroset" mechanism which regulates the open side setting and reportedly permits rapid compensation for wear on the concaves or mantle. The crusher is powered by a 350-hp., 720-r.p.m. motor.



Shown above is the 1800- to 2200-t.p.h. gyratory crusher to be installed at the new $15,000,000 Presque Isle, Mich., limestone operation

The 30-70 "Superior" secondary crusher, also supplied by Allis-Chalmers, has a 1200-t.p.h. capacity. It has a maximum setting of 5½-in. on its open side, and is also equipped with the automatic regulator. Power is supplied by a 250-hp., 720-r.p.m. wound-rotor motor.

Employe Incentive Bonus

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, recently granted incentive bonuses, ranging from 3 to 9 percent of total 1953 wages, to employes at the company's Toledo and Bay Bridge, Ohio, and Wampum, Penn., plants. The Toledo employes received incentive bonuses amounting to 3 percent of their entire 1953 wages. Employes at the Bay Bridge plant were given bonuses of 9 percent, and those at Wampum received 7 percent bonuses. The total amount of bonus money paid in the district was $151,000, according to Rolland Ries, secretary-treasurer of the A.F. of L. United Cement, Lime & Gypsum Workers' District Council No. 9.

Plant Expansion

GEO. W. MCDEARMON, Baton Rouge, La., recently announced completion of the second phase of an expansion program, designed to increase the production facilities of the lightweight aggregate plant from 333 cu. yd. of finished aggregate daily to 900 cu. yd. daily. The first phase of the expansion was completed early in December and increased daily output to 450 cu. yd. The second phase, completed in early March, included the installation of new grinding facilities.

Current projects of the company include the supplying of about 12,500 cu. yd. of lightweight aggregate for concrete in a 14-story hotel being constructed in New Orleans, La., and about 25,000 cu. yd. of aggregate for a "Lift Slab" construction job in the Baton Rouge area.

Stone Quarry

THE HECKMAN AND REYNOLDS STONE QUARRY, Floyd, Iowa, recently completed an expansion program, including the installation of a new storage bin, and the replacement of all diesel engines with electric motors. The company, which is owned and operated by K. E. Heckman and Bob Reynolds, produces agricultural limestone and road stone.

Dravo Activities

DRAVO CORP., Pittsburgh, Penn., recently reported that the high rate of construction activity in the Greater Pittsburgh area gave the company's Keystone Division substantial orders for sand, gravel and ready-mixed concrete during 1953. To meet the continuing demand, Keystone added 12 new welded steel barges to its river fleet late last year.

Keystone's Freedom, Penn., plant, one of its six plants in the Pittsburgh area, was vacated last year, after 30 years of operation, to make room for the Pennsylvania Railroad's Conway Yard expansion program. A modern new plant to replace it is now partially in operation at Rochester, Penn.

Among the major jobs served by Keystone in 1953 were the Pennsylvania Railroad's Conway Yard improvements; Ceco Steel Products Corp. warehouse in West Mifflin; Moon Township Senior High School; new foundry at Edgar Thompson Works of U. S. Steel Corp.; the Point Park retaining wall; Fleming Park Bridge; and Westinghouse Research Laboratory in Churchill.

Safe-Driving Awards

FOUNTAIN SAND & GRAVEL CO., Peublo, Colo., recently honored 13 of its truck drivers at the company's annual safe-driver awards dinner and meeting. The meeting climaxed a year-long safety contest between two teams of company employes. Scoring was based on safety, maintenance of equipment, and courtesy. Five drivers received awards for not having a chargeable accident during the year. The safety competition was inaugurated by the company two years ago and, since then, property damages reportedly have been reduced by about 85 percent.

Gypsum TV Advertising

NATIONAL GYPSUM CO., Buffalo, N.Y., is sponsoring a TV program, starring Dave Garroway, as a part of its advertising and sales promotion activities. On the N.B.C. network between 7:00 and 9:00 a.m., Mr. Garroway demonstrates to viewers how they can use "Gold Bond" building products to "add-a-room" in unused space in their homes.

Among the Gold Bond products scheduled for the 52-week "Today" participations are: Velvet paint, rock wool, gypsum wallboard, grainboard, asbestos shingles and insulation plank and tile. The television sales story on these products feature a "do-it-yourself" format. Viewers are also offered "do-it-yourself" brochures featuring step-by-step construction details and estimated costs prepared by experts. This marks the first time the company has used network television to advertise its complete line of building products. J. D. Elgin is the director of advertising and sales promotion for National Gypsum Co.

Free Lime Determination

A RECENT ISSUE of *Limeographs*, a publication of the National Lime Association, called attention to an article in Vol. 25, 12, December, 1953, *Analytical Chemistry*, p. 1844-1848, by Assarson and Bokstrom of the Swedish Geological Survey, Stockholm, Sweden, which described in detail a new method of determining the amount of uncombined calcium oxide and hydroxide in limes, cements and silicate products, with the use of glycol.

Change of Ownership

AMERICAN TRIPOLI CORP., Seneca, Mo., formerly owned by J. C. Miller Co., manufacturer of electroplating and polishing equipment and supplies, Grand Rapids, Mich., was recently sold to Carborundum Co., Niagara Falls, N.Y. Cost of the purchase was reported as in excess of $2,500,000. The Missouri plant produces tripoli powder from an unusual form of silica found in the foothills of the Ozark Mountains. Approximately 3000 acres of land, reportedly containing all the known deposits of tripoli in the world, are owned and under lease by the corporation.

Brazilian Cement

PRODUCTION OF CEMENT in Brazil reportedly reached a total of 1,466,374 tons during the first nine months of 1953. This is equivalent to an annual rate of about 2,000,000 tons. A number of developments now under way are expected to boost production to 3,000,000 tons in 1954 and to 4,000,000 tons in 1955.

Plant Expansion

TYRONE LIME & STONE CO., Tyrone, Penn., is currently investing $113,000 for the installation of new equipment and for other plant improvements. The plant has an operating personnel of 55 employes.

Pavement Yardage

AWARDS of concrete pavement for the month of January are listed by the Portland Cement Association as follows:

	Sq. yd. awarded During January, 1954
Roads	1,852,016
Streets & Alleys	1,125,444
Airports	1,748,240
Total	4,725,700

Aggregate Plant

WESTERN SAND & GRAVEL CO., Amarillo, Texas, is building a new plant at Tascosa, Texas, which will be operated under the name of Western Aggregates, Inc.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 20,243,000 bbl. of finished cement in December, 1953, as reported by the Bureau of Mines. This was a decrease of 3 percent compared with the output in December, 1952. Mill shipments totaled 14,130,000 bbl., an increase of 3 percent over the December, 1952, figure, while stocks were 20 percent above the total for the same month in 1952. Clinker production during December, 1953, amounted to 21,660,000 bbl., a decrease of 2 percent compared with the corresponding month of the previous year. The output of finished cement during December, 1953, came from 156 plants located in 37 states and in Puerto Rico. During the same month of 1952, 20,881,000 bbl. were produced in 156 plants.

Stone Plant Expansion

NEW YORK TRAP ROCK CORP., New York, N.Y., has announced completion of the $1,000,000 expansion and construction program at its Haverstraw stone processing plant, described in ROCK PRODUCTS, May, 1953, page 71. The installation was begun in March, 1952, with the removal of the crusher and other machinery from the company's Cold Spring facilities. The Cold Spring plant was purchased by Trap Rock in 1946, but was never operated by the company.

Seeks Dredging Permit

PORTLAND GRAVEL CO., Portland, Ore., has applied for a permit to dredge for gravel in the Willamette River, beginning at the southern Portland city limit and extending upstream to the mouth of the Clackamus River near Oregon City.

Moves Office

FLORIDIN CO., which operates fullers-earth plants at Quincy and Jamieson, Fla., has announced the removal of its executive offices from Warren, Penn., to Tallahassee, Fla. Allan C. Jackson is president of the company, and C. L. Sowell is vice-president in charge of production.

Gypsum Vermiculite Plaster Fire Ratings

THE VERMICULITE INSTITUTE has announced that the new gypsum-vermiculite plaster fire-resistance ratings for columns and various ceiling constructions were recently approved at the annual meeting of the Pacific Coast Building Officials' Conference, for inclusion in their Uniform Building Code, which has been adopted by over 600 cities, and is used as a reference by building officials throughout the nation. All previous fire ratings for vermiculite plaster fire protection are already a part of this code.

The new ratings, established in fire tests conducted by Vermiculite Institute and the Gypsum Association, include: A 4-hr. rating for a 1¾-in. thickness of gypsum-vermiculite plaster over self-furring metal lath wrapped directly around steel or cast-iron columns; a 4-hr. rating for a steel joist or light steel floor or roof construction having an attached or suspended ceiling consisting of a 1-in. thickness of vermiculite plaster on ⅝-in. perforated gypsum lath; and 3-, 2- and 1-hr. ratings for these floor and roof constructions with gypsum lath and lesser thicknesses of vermiculite plaster.

A.I.M.E. Meeting

THE OREGON SECTION of the American Institute of Mining and Metallurgical Engineers will be host to the A.I.M.E. Pacific Northwest Metals and Minerals Conference to be held in Portland, Ore., April 29-May 1, 1954.

F. X. Cappa, conference chairman, reports that the 3-day technical program, which will be open to the public, includes four sessions on metals technology and will feature iron and steel and both extractive and physical metallurgy. Two sessions are planned on industrial minerals, one on engineering geology, one on ground-water, and one on mineral industries education.

Weight Law Upheld

THE CONSTITUTIONALITY of the Wisconsin state truck-weight law, under which penalties for overloading are assessed on a sliding scale, was recently upheld by the Supreme Court. A decision by the municipal judge at Waukesha against Edward Lutz Sand & Gravel Co. and Milton Vernon Seraphine, for an overloading offense at Menomonee Falls, was upheld by the high court.

Sand and Gravel Plant

SOUTHWEST CONSTRUCTION MATERIALS CO., Dallas, Texas, recently opened a new sand and gravel plant south of Dallas, near the Houston Expressway. The new operation will be known as the Keller plant. F. R. Gifford is general superintendent and Carl Crocker is in charge of production.

Ownership Change

RINKER MATERIALS CORP., West Palm Beach, Fla., recently acquired Portland Industries, Inc., and will continue to operate the company under the same firm name, with Rosser Elkins in charge.

Seeks Dredging Permit

THE KELLEY ISLAND LIME AND TRANSPORT CO., Cleveland, Ohio, has applied for a permit to dredge sand and gravel for commercial purposes in Lake Erie, off Vermilion.

Vermiculite Wall Panels

A NEW BUILDING MATERIAL, made of vermiculite, slag, oil and water, has been developed by a Flint, Mich., company for exterior residence walls and office and factory partitions, as recently announced in *Vermiculite News*, publication of Zonolite Co., Chicago, Ill.

Trade named Modern-Crete, the material is supplied in 8- x 16-ft. panels in various thicknesses and forms. Though it weighs only about half that of conventional concrete, it reportedly will carry a weight of 25 tons. Time-saving is said to be the material's big advantage. Using Modern-Crete wall panels, two 26- x 36-ft. houses, reportedly were erected in eight hours (four hours each), ready for the roof construction.

Plant Sold

LAKESIDE GRAVEL CO., Bellevue, Wash., recently announced the sale of its building materials division at Factoria, Wash., to Galbraith and Co., but will continue to operate its Issaquah sand and gravel plant, according to Orville E. Gibson, president. Bert F. Morris, president of the Galbraith company, revealed that plans are being made to expand the Factoria building materials plant.

Resumes Stone Production

SCIOTO LIME AND STONE CO., Delaware, Ohio, recently announced it has resumed the production of crushed stone, after taking over its stone quarries which had been under lease for the past five years to National Lime and Stone Co. The Scioto company's current production includes crushed stone, agricultural limestone and sand.

Plans New Cement Plant

CALIFORNIA PORTLAND CEMENT CO., Los Angeles, Calif., recently revealed plans to build a $12,000,000 cement plant near Mojave, Calif., in Kern County. The announcement was made at a recent hearing of the State Lands Commission on the application of Redlock Corp., subsidiary of the cement company, to purchase 2000 acres of land, which would supplement 1400 acres already acquired by Redlock Corp., and 4500 acres owned by the parent company. The two companies reportedly have invested $750,000 in land and engineering. California Portland Cement Co. currently operates a cement plant at Colton, Calif.

Gypsum Production

DOMESTIC MINE PRODUCTION of crude gypsum during the third quarter of 1953 totaled 2,107,760 short tons, which was a 3 percent decrease from the 1952 third quarter output, and a 7 percent decrease from the record-high output of the 1951 third quarter, as reported by the Bureau of Mines. Imports were 2 percent lower than in the same period of 1952. Calcined gypsum was produced in slightly greater quantity, indicating some reduction in crude stocks.

The tonnage of uncalcined gypsum used as portland-cement retarder remained at a high level. A sharp decline was noted in the sales of agricultural gypsum, while major increases again were registered by sanded (including perlite-premixed) plasters and by the "other building plaster" classification. The latter includes roof-deck plasters used for poured-in-place gypsum roofs, floors, fire-proofing, etc. Except for a 34 percent gain in plate-glass and terra-cotta plasters, none of the industrial plaster classifications showed important changes. The unseasonal high level of production of lath and wallboard noted in the early months of 1953 tapered off to 1952 levels by midsummer, with 1953 third quarter output roughly approximating that of 1952.

The production of gypsum and gypsum products during the third quarter of 1953, according to uses, was reported by the Bureau of Mines as follows:

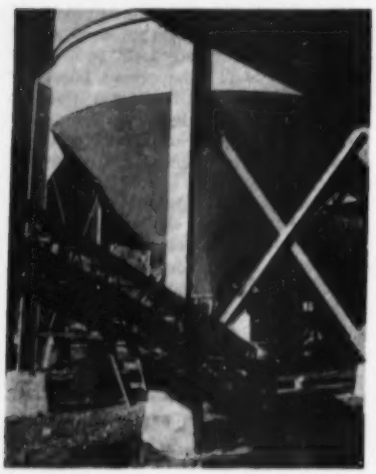
	Short Tons	
	1953	1952
Crude gypsum:		
Mined	2,107,760	2,163,875
Imported	1,189,648	1,218,073
Calcined gypsum produced	1,867,105	1,845,651
Gypsum products sold or used:		
Uncalcined uses:		
Portland-cement retarder	508,081	476,033
Agricultural gypsum	87,069	120,861
Fillers and unclassified	6,233	6,201
Industrial uses:		
Plate-glass and terra-cotta plasters	14,747	10,980
Pottery plasters	9,899	10,506
Dental and orthopedic plasters	2,762	2,654
Other industrial uses	32,458	34,298
Building uses:		
Base-coat plasters	473,536	533,226
Sanded plasters	85,835	51,583
To mixing plants	3,078	3,176
Gauging and molding	44,274	46,437
Prepared finishes	3,247	3,679
Other building plasters	95,401	60,408
Keene's cement	12,081	13,337
*Lath	660,025	645,548
*Wallboard and laminated board	873,013	867,775
*Sheathing	35,042	34,399
*Tile and miscellaneous	7,301	6,265

*M sq. ft.

HH

Unloading Bins

INABILITY OF A MATERIAL TO FLOW out of a bin so as to empty the container completely has been a source of trouble to many operators. To assure adequate flow of material, proper



Silo with cone-shaped bottom sloped 50-deg.

slope of the bin is necessary. The illustration shows a bin installation at a Georgia operation which comprises a steel silo with a cone-shaped bottom that has a 50-deg. slope. This appears more than adequate for free-running materials that are dry. This silo holds a minus 2-in. product that is rather harsh and which has had the minus ¾-in. size removed prior to being placed in the bin. It empties itself without vibrators or other exterior means.

Barge Loading

A GRAVEL PRODUCER in the Northwest, who ships a considerable portion of his product by barge, has set up an efficient triple barge-loading system. One belt conveyor system loads directly to the barges from a reclaiming tunnel under open bins which are a part of the plant. Over one leg of this belt system, a hopper has been installed so that trucks can dump to it. Nearby is the ground-stored material where a second hopper has been provided so that a clam shell crane can dump to it. Thus, if desired, the barges may be loaded from three sources. The illustration shows the details of the installation.

Blending Additives

CURRENT TRENDS indicate that the time is not far distant when all types of rock products producers will be

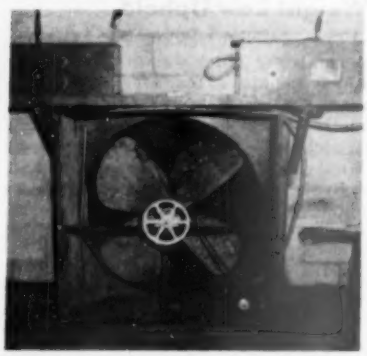
Electrically vibrated feeder over reclaiming belt provides simple means for blending

asked by their customers to add, or blend, small amounts of additives to their material. Pre-ground silica flour may have to be added to current sand production to obtain the extremely fine material that is now often lost in the washing plants. Some advocate adding silica flour to the portland cement clinker and intergrinding at the plant. Patents have been issued on a similar idea using diatomaceous earth. Some concrete technologists want opaline rock in the mix; others want it removed, or a corrective added to combat it. Dry pozzolonic materials ranging from calcined diatomaceous earths, Puenta shales, pumicite, pulverized glass, micron dusts from artificial lightweight aggregate plants are some of the additives currently being used or advocated. The next step, to insure more and better mixing, is to start the adding at the rock plant. The illustration shows how one stone producer rigged up his plant so that he might add 7 lb. of calcium chloride to each ton of crushed rock processed. The installation consists simply of an electrically vibrated feeder over the reclaiming belt. This starts the material on its way to better mixing.

Ventilator Installation

AT A LIGHTWEIGHT AGGREGATE OPERATION, the electrical control room contains the conventional electrical controls, plus a couple of electronic units which are a part of the coal-pulverizing system (coal is the fuel used for the rotary kilns).

To maintain a uniform and cool temperature, a louvered door is pro-



Ventilating fan, placed at opposite end of room from door filters, keeps room cool and at uniform temperature

vided, over which a filter cloth has been placed so that the incoming air is dust-free. Near the bottom of the concrete block structure and near the floor line is a large ventilating fan that draws clean air through the door filters and ejects it into the atmosphere. The door is located at the opposite end of the room from the fan.

The two rectangular boxes, shown above the fan, are a part of the coal-grinding control system which involves a "probe" in the ball mill that grinds the coal. The probe picks up energy and transmits it to the electronic units in such a manner that the level of the coal in the ball mill is always constant.

Barges may be loaded from either the reclaiming tunnel, the crane hopper or the truck hopper

Portable Blasting Shelter

AT A GRANITE QUARRY in the South, a Travel drill does the secondary drilling. Dynamite charges for shots of this type are usually not large

Blasting shelter, made from old boiler, can be moved by dragging or by shovel. Heavy screen at right of door permits observation of blasting procedures without exposing quarry employes to danger

so the quarry men need not be far distant from the point of detonation. These operators have several blasting shelters made from old boilers, similar to the one shown in the illustration. The shelter can be moved by dragging it, or by use of a shovel. Note the heavy screen at the right of the door. This permits the blaster to watch the procedures without exposing himself to danger. The shelter is rugged enough that it can be kept reasonably close to the rock pile when blasting.

Hard-Facing Screw Flights

THE WEARABILITY of low carbon steel extrusion screw flights on a cement- and sand-mix extrusion machine is reportedly being tripled at the plant of Roman Stone Construction Co., Brooklyn, N.Y., by hard facing the surfaces of the screws with Colmonoy No. 1 iron-base alloy, a product manufactured by Wall Colmonoy Corp., Detroit, Mich.

Extrusion screw flight which has been hard-faced to give greater abrasive and impact resistance, and thus, longer wearability

These extrusion screws are made up of a series of five flights, 8 in. in dia. and 16 in. long. Unfaced screws are said to last only 15 min. in extruding the extremely abrasive mixture, while the hard-faced screws reportedly last through the complete extrusion cycle of 45 min.

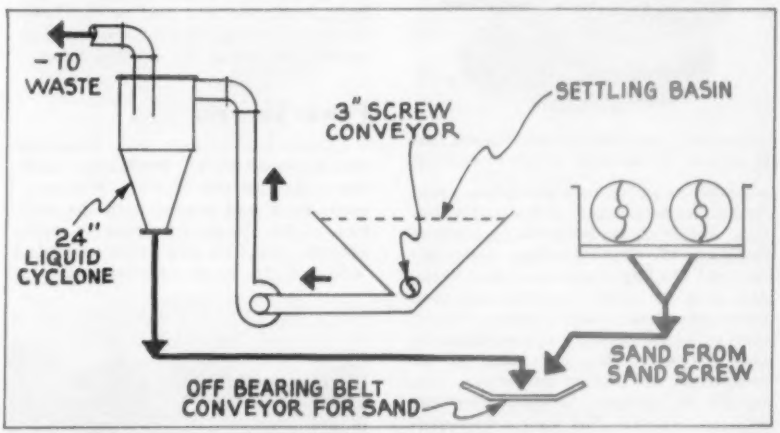
The hard-facing material is applied by a 140-160 amp. d-c arc welder using a $\frac{5}{16}$-in. dia. Colmonoy No. 1 yellow tip electrode. About 15 min. are required for refacing the flights at the end of each cycle, by patching up eroded pockets and building up the periphery to size. The welding operation is followed by a 10-min. rough-grinding operation.

This iron-base alloy, which contains chromium and boron, melts at 2400 deg. F. and has a Rockwell C hardness of 58-63. It is claimed to have good abrasion and impact resistance, as well as weldability properties.

These extrusion screws at Roman Stone Construction Co. are used in machines making the cement- and sand-mix for a building stone resembling Perma-Stone. Screw flights on extrusion machines in cement plants are of similar design and said to be equally applicable to the hard-facing process described.

Sand Recovery Unit

AN OHIO SAND PRODUCER needed more fines in the product so, alongside the 36-in. x 25-ft. twin Eagle screws, a hopper-bottomed settling basin that has an area of about 4 x 16 ft. was provided. In the bottom is a 3-in. dia. screw conveyor. Turbulence is small so that the finer sands settle and are delivered to the opposite end from the incoming pulp. In the bottom the sand is picked up by a pump and delivered to a 24-in. liquid cyclone. The liquid cyclone recovers the sand at a sufficiently low water content so that it is blended with the sand on the off-bearing belt from the Eagle screws. In the foreground of the illustration is the fine sand settling basin.



Showing details of sand recovery unit

Arrow points to pipe carrying fines from liquid cyclone to belt under sand recovery units. Fine sand settling basin is in foreground

NEW Machinery

Rotary Airlock Feeder

PRATER PULVERIZER CO., Chicago 50, Ill., recently announced the Model PAV-12 heavy-duty rotary airlock feeder with a 12-in. diameter inlet and discharge, for handling finely ground or granular abrasive materials such as pulverized phosphate rock, fly ash, cement, clay, silica and alumina. The unit is designed to prevent flushing of free flowing materials through stuffing glands and dust seals, and may be used in removing such materials from rotary dryers, coolers, dust collectors, electrical precipitators, bins, hoppers, etc., operating at atmospheric or higher pressures. Materials at elevated temperatures can also be handled. The feeder incorporates a closed pocket rotor to prevent air or gas leakage into or out of the system. It is adaptable to pneumatic systems in use today, and is said to operate equally as well under pressure or suction. It is available with or without packaged power.

Heavy-duty rotary airlock feeder handles finely ground or granular abrasive materials

Adapt Welder to Magnetic Flux

STOODY CO., Whittier, Calif., has developed a nozzle adapter which is said to permit the adaptation of the Brown Boveri magnetic flux method of automatic welding to conventional semi-automatic or "squirt" welders.

Two types of adapter tips installed on standard hoppers. The original tip is also shown

The process utilizes the magnetic field created by the passage of the electric current through the bare electrode, plus a magnetic alloy flux which coats the wire immediately ahead of the welding arc. The operating cycle is completed by the use of permanent magnets in the nozzle adapter which act as a dam to the flow of flux whenever the arc is broken. The adapter tip, which replaces the standard tip, centers the wire to provide a concentric flux coating, and governs the amount of flux applied to the wire. As applied to build-up and hard-facing, the magnetic process is said to provide a deposition rate of 8 to 20 lb. of deposited metal per hr., using $\frac{5}{64}$-in. or $\frac{3}{32}$in. wires, the rate depending upon amperage. A series of magnetic flux materials designed for build-up and hard-facing overlays have been developed and will be marketed under the trade name of Stoody Magnecote, numbered for identification.

Power Shovels

CLARK EQUIPMENT CO., Construction Machinery Div., Buchanan, Mich., has expanded the line of "Michigan" excavators and cranes with the addition of two ¾-cu. yd. capacity power shovels, crawler and truck mounted. Model C-24 is a crawler-excavator

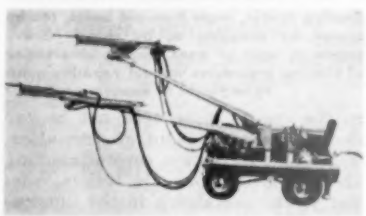
Crawler-mounted model is equipped with automatic spring-loaded, self-locking brakes

and, Model T-25, a truck crane, available with a 6 x 4 drive or 6 x 6 all-wheel drive with optional power steering. The truck chassis is powered by a heavy-duty 529-cu. in. engine with a five-speed forward, one-speed reverse transmission and a two-speed transfer case. Heavy-duty double reduction tandem rear axles with torque arm suspension and a rocker beam mounting are featured. Telescoping rear and center outriggers are standard equipment.

The crawler model is equipped with automatic spring-loaded, self-locking brakes, which are disengaged by air rams when traveling, and the drive gears are completely enclosed and running in oil. The car body, circle gear and roller paths are integrally cast. A core type pad, 24-in. wide, with self-cleaning driving sprockets is featured on the crawler track. An independently-operated worm gear boom hoist is standard equipment on both models, and all shaft and drum clutch controls of this unit are air-ram operated.

Self-Propelled Rock Drill

GARDNER-DENVER CO., Quincy, Ill., has brought out the JSP Mobiljumbo self-propelled drill with remote positioning and drilling controls. One lever on each side of the control panel raises or lowers the machine on jacks



Drill with remote position and drilling controls

for stability while drilling. Another set of levers raises or lowers each boom independently, while other levers swing the booms laterally. The drills are positioned by hydraulic cylinders near the end of each boom and, can be positioned for down or up holes, as well as for horizontal holes. The positioning is hydraulically locked and is said to be free from creeping. The complete drilling cycle for each drill, including drill speed, feed pressure, hole cleaning and steel withdrawal, is also remotely controlled from the operator's seat. Each set of side wheels is chain driven by an air motor and, the carriage can be steered by powering one set of wheels at a time. Where underground lighting is needed, the unit can be equipped with an air-motor-driven generator. Various boom lengths are available for drilling faces up to 14 ft. high. Face widths of 25 ft. can be drilled off from a single positioning of the unit.

Crushing-Screening Plant

PIONEER ENGINEERING WORKS, INC., 1515 Central Ave., Minneapolis, Minn., has developed a single-unit stone crushing and screening plant, Model 33R, designed for fast production of aggregates from local quarries. It features a triple roll crusher which allows two almost simultaneous passes of the rock, and also permits mounting all units of the plant on one

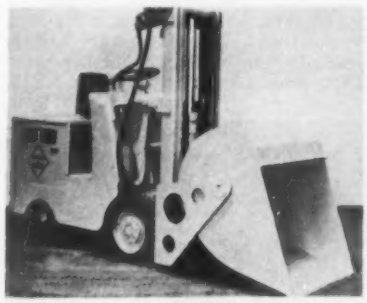
chassis. An 18- x 30-in. jaw crusher, an apron feeder mounted on the plant, a 1½-deck sizing and separating screen and a 30- x 18-in. triple roll secondary or reduction crusher are

Crushing and screening plant features triple roll crusher

included. The overall length, less towing hitch, is 45 ft. 10 in., the moving height with the apron feeder removed is 12 ft. 6 in., and moving width, 9 ft. 8 in. Total weight without the power unit is 71,000 lb.

Fork Truck Scoop

ELWELL-PARKER ELECTRIC CO., 4205 St. Clair Ave., Cleveland 3, Ohio, has developed a scoop attachment for use on its hydraulic-powered fork trucks in handling fine bulk materials. The scoop features anti-friction bearings



Hydraulic-powered fork truck with scoop attachment

which support the scoop trunnions, a double-acting hydraulic cylinder which moves the unit from loading to carrying position, and a replaceable wear strip on the scoop lip. The overall scoop width is 37⅜ in., the scoop content is 25 cu. ft., the lb. capacity being determined by the fork truck capacity.

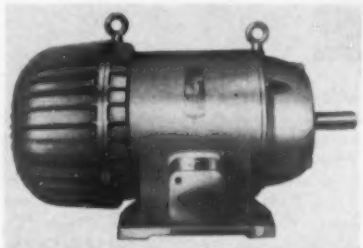
Electrode Holder

TWECO PRODUCTS CO., Boston at Mosley, Wichita 1, Kan., has brought out the Twecotong "Rod-Rated" Model A-516 Air-Way manual electrode holder which features air vents, between the holder castings and the insulation, through which the heat from the arc is dispelled. The holder is designed to handle electrodes through $\frac{5}{16}$ in., and to hold rods as small as $\frac{1}{32}$-in. diameter. It has a large diameter handle, which has only point contact with the holder casting, to permit a free flow of cooling air, the wedge-shaped upper jaw providing pressure with a minimum contact area. The unit weighs 27 oz., and is supplied with "Super-Mel" laminated glass cloth insulation to resist heat and impact.

Lightweight holder has air vents between the holder castings and the insulation

Fan Cooled Motor

REULAND ELECTRIC CO., Alhambra, Calif., has introduced high-velocity fan-cooled motors, available in ratings from 15 hp. through 30 hp., featuring a drip-proof construction. The units may be furnished with either a standard single-end shaft or special hydraulic pump mount endbells. Because of the internal cooling capacity, higher horsepower ratings can be obtained from small frame sizes. An example of this design is shown in the illustration where a 30-hp. motor is built into a No. 326 frame. The fan is mounted on the motor shaft and is housed within the fin-type endbell. Air is sucked in through a screen filter opening and blown with force over the internal areas.



High-velocity, fan-cooled, 30-hp. motor has a No. 326 frame

Heavy-Duty Excavator

BUCYRUS-ERIE CO., South Milwaukee, Wis., has announced additional features on its heavy-duty model 22-B, ¾-cu. yd. crane-excavator. A long frame crawler mounting is designed to provide increased bearing area for traction, or stability and maneuverability for dragline, crane and clamshell operations. As a lifting crane, the model carries boom lengths from 35 to 70 ft. (with removable inserts). The boom suspension is of the pendant type, the lengths matching the boom inserts, with eight sections of operating line between the bridle and boom point. A 16-part suspension with pendants is available as extra equipment for booms 40 ft. or longer. Independent power controlled lowering on the main hoist line is provided, as well as power controlled boom

Heavy-duty lifting crane and clamshell-dragline excavator

hoisting and lowering. Other features include a friction swing brake, in addition to the swing lock, and boom stops of the telescoping pipe type. When equipped for dragline or clamshell operations, the unit carries booms ranging from 35 to 50 ft. Shovel and dragshovel front ends are not offered with the model, but are furnished with the standard 22-B machine and the 22-B transit crane.

High Lift Loader

BAKER-LULL CORP., Minneapolis, Minn., has announced a "High Lift" model of its Shoveloader, designed for loading gondola cars, hoppers and trucks with bulk materials. The loader has lifting heights to 16 ft., dumping heights to 14½ ft. and load capacities as high as 6000 lb. Accessory tools available for the unit include a coal and snow bucket, a loose material bucket, a material bucket, and a crane hook tool for general materials handling work. Double-acting

Loader has lifting heights to 16 ft. and dumping heights to 14½ ft.

hydraulic cylinders enable the operator to shake the bucket while in dumping position. The loader is available mounted on Case, Minneapolis-Moline, Sheppard or Oliver industrial wheel-type tractors.

CALAVERAS Increases Capacity

Improvement program of Calaveras Cement Co., for cement plant at San Andreas, Calif., includes addition of a fourth kiln and two raw grinding mills

New 200-ft. stack serves all four kilns. It is 30 ft. inside diameter at the base

CALAVERAS CEMENT CO., with its plant located near San Andreas in the foot-hill country adjacent to the gold mining belt of California, is now in its 28th year of production. Manufacturing facilities have kept pace with the growth of the state.

Due to its favorable location, the company has derived a considerable volume of business from the large concrete dams built in California by the U. S. Army Corps of Engineers, The Bureau of Reclamation, private power utilities, and irrigation projects. Calaveras cement is currently being trucked to Folsom dam on the American river east of Sacramento, and was used in the construction of Pine Flat dam on the Kings river near Fresno. (See ROCK PRODUCTS, March, 1953, page 72 for a description of the Folsom dam operations, and the February, 1952, page 104, issue for an account of Pine Flat activities.)

Cement is distributed by Calaveras dealers in almost 400 cities and towns in the marketing area which embraces western Nevada and parts of Oregon. This dealer distribution set-up is the backbone of the company's marketing outlets.

Calaveras Cement Co. was one of the first to grasp the full significance of bulk transportation by trucks, and its low cost and convenience has materially aided in merchandising the company's products.

Add New Kiln

To keep pace with the growth of the West, the company placed its fourth kiln in operation during September 1952. The new rotary kiln is an 11-ft. 3-in. x 360-ft. Allis-Chalmers unit, installed alongside of kiln No. 3.

Airplane view of plant since the addition of kiln and other improvements

by WALTER B. LENHART

Again

Right: One of two 9- x 26-ft. mills on raw grinding side. It is driven by a 1250-hp. motor

Firing end of kiln with part of modern control room, to the right

The new unit is provided with an Allis-Chalmers shaking cooler. Kiln controls are said to be the most modern of any cement plant in the country, and were installed under the direction of the Swanson Engineering Co. of Inglewood, Calif. Nels Swanson, head of this company, was formerly with the Foxboro Co. Because of the importance of modern kiln control to the portland cement industry, a detailed description and analysis of the control features will be published later.

Under the chain section of the new kiln, Harbison-Walker castibles (cast in place refractory material) are used. In the burning section, Canadian Refractories "Magnecon" is used with 70 percent alumina ahead of and behind the Magnecon. The remainder of the kiln lining follows conventional practice. The draft fan is driven through an Electric Machinery Co. magnetic clutch coupling named "Regutron." With this type of clutch-coupling, the motor runs at constant speed and slippage in the clutch regulates the speed of the fan.

A new 200-ft. high stack serves all four of the kilns. The stack has an inside diameter of 30 ft. at the base.

Raw Grinding

Two new 9- x 26-ft. ball mills added to the raw side are the largest Marcy ball mills to be used in the portland cement industry. Each is driven by a 1250-hp. Westinghouse Simplex, synchronous motor. This type of motor starts like a slip ring motor. No clutch is used and power is applied across the line. It is said to draw less starting power than a straight 600-hp. synchronous motor similar to those used on the 9- x 9-ft. Marcy prelim-

The line sketch gives the mill tonnage flow with additional pertinent data. A careful sampling of one of the units taken early in March, 1953 gives the following screen analysis:

9 x 9 FEED

Mesh	Wt.	%	Acc. Wt.	Acc. %
1½ in.	283.5	6.75	283.5	6.75
26.67 mm.	854.0	20.33	1137.5	27.08
18.85 mm.	684.0	16.28	1821.5	43.36
13.33 mm.	451.0	10.73	2272.5	54.09
6.68 mm.	463.5	11.03	2736.0	65.12
No. 4	101.0	2.40	2837.0	67.52
10	177.5	4.22	3014.5	71.74
35	567.0	13.50	3581.5	85.24
48	124.0	2.95	3705.5	88.19
60	56.5	1.34	3762.0	89.53
80	71.0	1.69	3833.0	91.22
100	40.0	0.95	3873.0	92.17
150	45.5	1.08	3918.5	93.25
200	38.5	0.91	3957.0	94.16
−200	243.0	5.78	4200.0	99.94

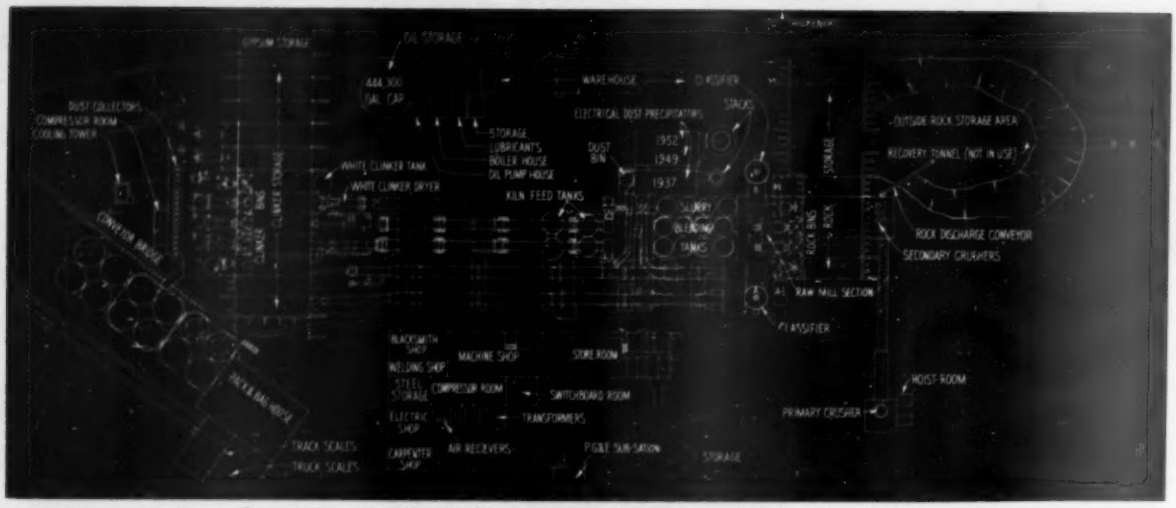
BOBTAIL O-FLOW

Mesh	Wt.	%	Acc. Wt.	Acc. %
10	0.0			
35	67.5	13.23	67.5	13.23
48	59.5	11.66	129.0	24.89
60	31.5	6.17	158.5	31.06
80	48.0	9.41	206.5	40.47
100	31.5	6.17	238.0	46.64
150	37.5	7.35	275.5	53.99
200	34.5	6.76	310.0	60.75
−200	200.0	39.21	510.0	99.96

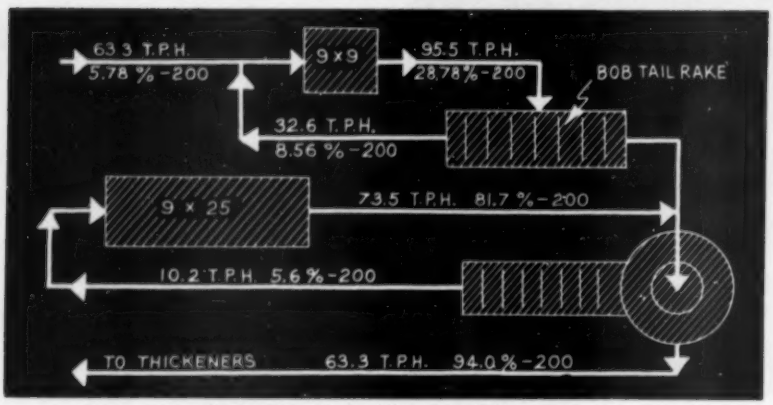
BOBTAIL SANDS

Mesh	Wt.	%	Acc. Wt.	Acc. %
13.33 mm.	51.0	6.19	51.0	6.19
6.68 mm.	41.0	4.98	92.0	11.17
No. 10	99.5	12.08	191.5	23.25
35	373.5	45.38	565.0	68.68
48	79.0	9.59	644.0	78.22
60	29.0	3.52	673.0	81.74
80	31.0	3.76	704.0	85.50
100	18.0	2.18	722.0	87.68
150	17.0	2.06	739.0	89.74
200	13.5	1.64	752.5	91.38
	70.5	8.56	823.0	99.94

(Continued on page 72)



Layout of San Andreas plant showing location of new grinding units and the four kilns, including new unit



Showing flow of material in raw grinding circuit

9 x 25 MILL DISCHARGE

Mesh	Wt.	%	Acc. Wt.	Acc. %
48	1.5	0.30	1.5	0.30
60	1.5	0.30	3.0	0.60
80	7.5	1.51	10.5	2.11
100	12.5	2.52	23.0	4.63
150	28.0	5.64	51.0	10.27
200	40.0	8.06	91.0	18.33
—200	405.0	81.65	496.0	99.98

9 x 9 MILL DISCHARGE

Mesh	Wt.	%	Acc. Wt.	Acc. %
26.67 mm.				
13.33 mm.	7.5	0.88	7.5	0.88
6.68 mm.	12.5	1.46	20.0	2.34
No. 10	36.0	4.23	56.0	6.57
35	229.0	26.90	285.0	33.47
48	94.0	11.04	379.0	44.51
60	44.5	5.22	423.5	49.73
80	60.0	7.05	483.5	56.78
100	41.0	4.81	524.5	61.59
150	43.0	5.05	567.5	66.64
200	38.5	4.52	606.0	71.16
—200	245.0	28.78	851.0	99.94

BOWL O-FLOW

Mesh	Wt.	%	Acc. Wt.	Acc. %
150	1.0	0.92	1.0	0.92
200	5.5	5.09	6.5	6.01
		93.98		
—200	101.5	94.0	108.0	99.99

BOWL SANDS

Mesh	Wt.	%	Acc. Wt.	Acc. %
35	1.5	0.37	1.5	0.37
48	6.5	1.61	8.0	1.98
60	12.0	2.97	20.0	4.95
80	71.5	17.74	91.5	22.69
100	96.5	23.94	188.0	46.63
150	126.0	31.26	314.0	77.89
200	66.5	16.50	380.5	94.39
—200	22.5	5.58	403.0	99.97

inator raw mill. The mill is loaded with 80 tons of 1½-in. balls with 1½-in. balls used for make-up. Pacific States Steel Corp. balls are used for the most part although some Colorado Fuel and Iron Co. grinding media has been used successfully. The liners are the rolled type, Lorain Chrome-Molybdenum alloy liners (not cast) and weigh 95,000 lb. The bearings are leaded bronze and this type of alloy is said to not seize on heating.

After the mills were in operation, the company installed a high pressure, manually operated oil pump which feeds lubricating oil under the trunnions using the same lubricant that the mill manufacturer specifies. The pump delivers up to 6000 p.s.i. This pressure is sufficient to slightly lift the trunnion allowing the oil to film over its surface. The pump is used only when starting the mills, and has eliminated starting troubles. The mills operate at 22 r.p.m. Floor space available in the raw mill section was one of the governing factors in the designed size of the mill.

In the raw mill there are two complete grinding set-ups which are practically identical. The main difference is that in one set-up a 9- x 9-ft. Marcy preliminator is used, and on the other an 8- x 7-ft. Marcy preliminator is employed. Each grinding system includes a rake classifier or bob-tail and a 24-ft. Dorr bowl classifier. The raw analysis of the material to the preliminator is shown in the appended screen data. The preliminator is in closed circuit with the rake classifier. Overflow from the rake goes to the 24-ft. Dorr bowl. The sand from the bowl goes to the new 9- x 26-ft. mill which is in closed circuit with the bowl. Overflow from the bowl goes to the thickeners. This section of the mill formerly had an 8- x 6-ft. preliminator, but this was changed to the 9- x 9-ft. unit. The smaller mill was then shifted over into the finish side. The new installation grinds 85-

(Continued on page 124)

How Does Material Flow From A Bin?

Studies of bin flow have developed equations for the engineer which are expected to simplify design and specifications for bins, feeders or conveyors

By JOHN K. RUDD*

FORCES governing the flow of solids in bins, chutes and hoppers may be accurately measured, and equations for solids flow may be drawn up. These equations would be analogues of the equations for liquid flow. Thus, a process engineer should eventually be able to design and specify bins, feeders or conveyors as precisely as he does tanks, pumps or fittings.

As a result of the past year's investigations on the nature of solids flow conducted at the materials-handling laboratory of Richardson Scale Co., Clifton, N. J., the following data was developed:

1. There are fewer factors determining flow than was generally thought. The key ones are: (a) for the hopper—head, diameter, slope angle of sides and diameter of discharge opening; (b) for the material—coefficient of friction, ratio of lateral to vertical pressure, specific weight and shear strength. Temperature and moisture content may be indirectly accounted for or overlooked *if* the sample tested is representative of process material.

2. To start flow of solids in a bin, only the forces acting on a central column of material extending up from the discharge opening have to be considered.

3. Material flowing from a confined area should be classified as either cohesive or non-cohesive. Flow for the two classes is so different that it best be attacked as two different problems.

4. There exists a minimum discharge opening for any given cohesive material in any given hopper or bin.

*Chief Research Engineer, Richardson Scale Co.

How Findings Were Made

So far, three investigations have been made and completed at the laboratory. They include:

1. Measurements of pressure created by a head of material in straight and slope-sided hoppers. These tests were made primarily to check Jannssen's equation for pressure in circular, straight-sided hoppers, and to see how far the equation applied to slope-sided hoppers.

2. Investigation of lateral and vertical pressures created by materials in different bin configurations. Lateral and vertical pressures, under a given head of liquid, are always equal. This is not true for solids because of friction between adjacent particles of material and cohesion of particles.

3. Investigation of the mechanics of flow. How do various materials behave when they flow from a bin? Are there any consistent patterns of flow? What effect has the geometry of the bin on discharge? What happens when material is removed from the bin while the bin is being fed? These are a few of the problems that we of the research staff tried to solve.

Little has been published in the field of solids flow. There have been some experiments conducted in soil mechanics; however, these studies are not generally applicable to investigation of solids flow in confined areas.

Pertinent research, though, was done by Jannssen and Airy. Both men have evolved equations for pressure exerted by material in straight-sided bins and hoppers.

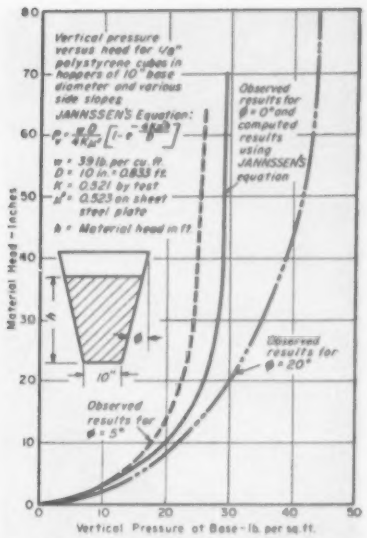

Vertical pressure versus head for ½" polystyrene cubes in hoppers of 10" base diameter and various side slopes
JANNSSEN'S Equation:
w = 39 lb. per cu. ft.
D = 10 in. = 0.833 ft.
K = 0.521 by test
μ' = 0.523 on sheet steel plate
h = Material head in ft
Observed results for θ = 0° and computed results using JANNSSEN'S equation
Observed results for θ = 20°
Observed results for θ = 5°
10"
Material Head - Inches
Vertical Pressure at Base - lb. per sq. ft.

Fig. 1: Curves show that Jannssen's equation for determining pressure on the discharge gate of a bin holds true only for circular, straight-sided hoppers. An equation applicable to both straight and slope-sides is being evolved

Jannssen's Equation:

$$P_v = \frac{wR}{K\mu'}\left(1 - e^{-\frac{K\mu' h}{R}}\right)$$

P_v = pressure on base, lb./ft.^{2}
R = hydraulic radius, ft.
K = ratio of lateral and vertical pressures in bin
μ' = coefficient of friction of material against bin wall
h = height of material in bin above base, ft.
w = specific weight of material, lb./ft.^{3}

Airy's Equation:

$$P_v = \frac{wD}{K(\mu + \mu')}\left(1 - \frac{\sqrt{1+\mu^2}}{\sqrt{\frac{2h}{D}(\mu+\mu') + 1 - \mu\mu'}}\right)$$

D = discharge diameter
μ' = coefficient of friction—material against bin wall
μ = coefficient of friction—material against material

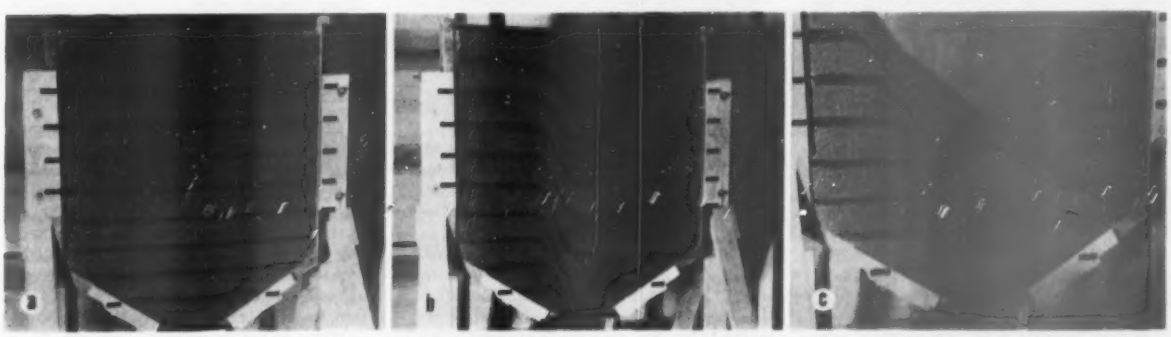


Fig. 2: Free-flowing material is discharged from a bin. (a) First picture was taken prior to discharge. Lines are thin layers of darker-colored material. (b) In the second picture, taken immediately after opening discharge gate, only material over discharge opening is flowing. (c) Third picture shows flow taking place largely in the central column. Upper surface is flowing into the central column. Angle of slide here is not equal to angle of repose

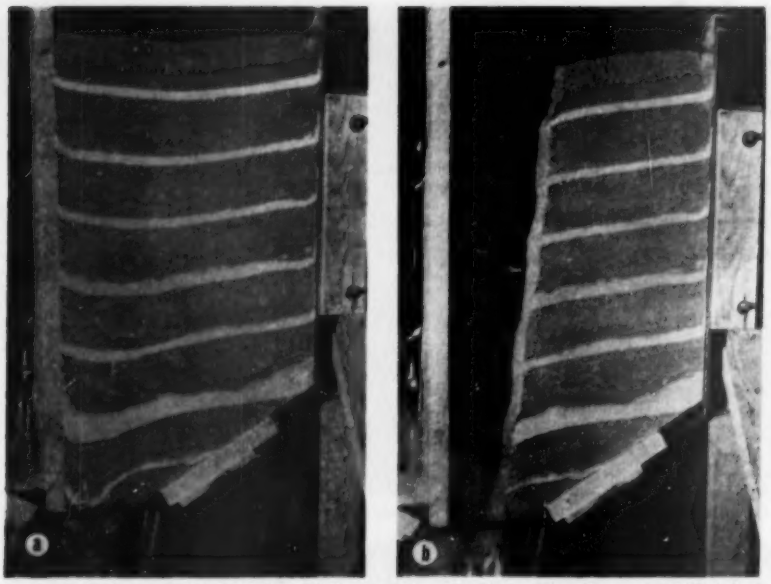


Fig. 3: Cohesive material is discharged from a bin. (a) First picture shows material before discharge. (b) Second picture was taken immediately after the central column moved out. It left as a plug, leaving this rat hole. Rapping was required to get the rest of the material to move out. Tests indicated that the key design feature governing flow was the size of the discharge opening, in relation to the proportions of the rest of the bin

First step in the investigation consisted of setting up experiments to check Jannssen's equation. Jannssen's equation was chosen instead of Airy's because the basis underlying it seemed fundamentally more sound. At the same time, it is a much simpler equation to work with. These assumptions, as experimental results indicated, were justified.

Test No. 1—Jannssen's Equation

To check Jannssen's equation, a series of small hoppers were built—a straight-sided hopper and hoppers having 5 and 20 deg. slopes from the vertical. A hydraulic cell was placed under the hopper at the discharge opening. Tests were run using ⅛-in. polystyrene granules, Portland cement and dry mash feed. Pressures on the full discharge opening were determined for known heads of material in the hopper.

Results of the tests with the circular, straight-sided hopper checked with theoretical values obtained from Jannssen's equation. But they also indicated that Jannssen's equation did not apply for slope-sided hoppers.

Our principal interest in these and subsequent investigations was in the hard-to-handle materials. There is no real problem handling dry free-flowing materials. However, non-cohesive materials were investigated to permit making comparisons, and to see if an understanding of non-cohesive materials would lead to a better understanding of the cohesive solids.

Test No. 2—P_l/P_v—K—?

After preliminary tests were concluded, it was felt that a more general equation than Jannssen's could be written. This equation would apply to slope-sided as well as straight-sided hoppers. However, first K (ratio of lateral to vertical pressure of the confined solid) would have to be found for the materials undergoing test.

K has a theoretical basis as shown by Rankine:

$$K=\frac{1-\sin\delta}{1+\sin\delta}$$

δ = angle of repose

However, this applies only for materials in an unconfined condition. To date, only a few values of K for confined materials have been determined and published, and those by Jannssen for dry grains.

To get values for K we had to design a testing machine and run our own determinations. The device, which was called a K-determinator, consists of a tank into which is placed a cylinder whose walls are made of extremely thin flexible rubber and whose ends are rigid.

A sample of material is placed in the cylinder and the cylinder installed in the tank. A given pressure is then established inside the tank, creating a known lateral pressure on the sample. A vertical pressure then is applied by a piston on top of the cylindrical sample.

Vertical pressure is increased until the rubber walls start to give way. At this point, the vertical and lateral components have been determined. Thus, P_l/P_v equals K.

It was found that K varies with height of material in the hopper and the diameter of the hopper. Therefore, in determining K, the height-to-diameter ratio of the test cylinder was chosen to comply with the hopper configuration under investigation.

Right now, with the values of K determined, it is possible to check test results with theoretical figures, and to chart test and theoretical curves (Fig. 1). From this data, it is believed that a general equation can be evolved.

Test No. 3—Flow Inside Bins

To study flow inside bins, a bin cross-section was built with a plate-glass front, metal back and with an adjustable discharge opening and tapering lower sides.

Using cohesive and non-cohesive materials, several studies of flow behavior with several bin configurations were made. For close observation, slow motion pictures were taken of the flow of material from the bin.

Results of these tests indicate:

1. A central column of flow exists above the discharge opening and is as wide as the opening. If material was being put into the bin at the same rate as it was being withdrawn, material outside the area of the central column consequently would remain static.

2. Material flows into the central column area as soon as the central column is discharged (Fig. 2).

3. With cohesive materials, a central "plug" moves out when the discharge gate is opened, and may leave a rat hole (Fig. 3). To get further flow in this case requires rapping or hammering on the bin.

It is believed that flow occurs when a stress is set up that overcomes the shear strength of the material. It is possible to find the shear strength for a material in any bin configuration. Apparatus has been designed that will permit its determination by measuring the force required to make a known plug of material shear against surrounding material.

Stress depends on the characteristics of a material and on the design of the bin. It can be determined as soon as a reliable equation has been evolved. When both stress and shear strength are known, conditions governing flow in a given process can be predicted.

To confirm theoretical findings, it is planned to build experimental hoppers. It should be possible to build a hopper with a certain discharge opening that will permit flow, and another hopper with a slightly smaller discharge opening that will not allow flow.

Shale Plant

THE MONARCH CEMENT CO., Humboldt, Kan., has started construction of a new shale processing plant which will replace the present shale facilities. The new plant, which is being built for the company by Carrothers Construction Co., Paola, Kan., will be located southeast of Monarch's general offices, and will have a 100-ton per hr. capacity. The building, housing the plant equipment, will be 50 x 180 ft., and will be constructed of concrete, structural steel and asbestos siding.

Looking down one of the aisles of main exhibit hall at N.S.G.A. convention from entrance stairway

Competition for Business

Reflected in Sand and Gravel Program

National conventions of sand and gravel and ready-mixed concrete industries draw attendance of over 4800. Quality, service and merchandising emphasized in proceedings

AN ALL-TIME RECORD of some 4800 registrants was established for the 38th annual meeting of the National Sand and Gravel Association and the 24th annual meeting of the National Ready Mixed Concrete Association held at the Conrad Hilton Hotel, Chicago, Ill., February 15-19. The figure surpassed by one-third the previously established record in 1952.

The combined meetings of the two associations were held in conjunction with the biennial machinery exposition which was by far the largest and most comprehensive exhibit of machinery and equipment for these industries ever held. There were 108 exhibitors of which several were forced to display their equipment in the adjacent parking lot for lack of facilities, again pointing up the great desire for more adequate exhibit space.

The question as to whether or not the two associations should consider the possibility of holding expositions in outside auditoriums came up for much discussion again. A special meeting of the Manufacturers Division to consider the problem was held on Sunday preceding the conventions and the boards of directors of the two associations likewise aired the problem thoroughly. Opinion was divided and the decision was made to again hold the next biennial exposition at the Conrad Hilton Hotel, Chicago, Ill., the week of February 13, 1956. The arrangement will be the same as this year, with the National Crushed Stone Association convention following, the week of February 20. The N.S.G.A. and the N.R.M.C.A. will hold their off-exhibit year meetings, January 9-13, 1955, in Miami, Florida.

The two associations will consider the possibility of holding an outside show in 1958, and the plan is to secure an option on such space, should the decision be made in favor of such an arrangement.

John W. Murphy, newly elected president

The excellent attendance at this year's meetings reflected the continued prosperity of both industries and the steady growth in numbers of companies entering the ready-mixed concrete industry. There was tremendous interest in the sessions, and the exposition as the industries enter a year of sharpened competition when the emphasis must be on operating efficiency, improved quality and better customer service. There were about 500 ladies registered, of which 313 were present at the ladies' brunch.

Program

Meetings of the two boards of directors and a joint luncheon meeting of the two boards were held the day preceding opening of the convention sessions. There was almost complete representation of the N.S.G.A. board and the entire N.R.M.C.A. board was present. Director of Engineering Stanton Walker summed up his activities for the year and outlined an enlarged program which will include several publications for the sand and gravel industry. It was voted to prepare a Drivers' Manual for the N.S.G.A. similar to the one that had been prepared for the N.R.M.C.A.

A. R. Shiely, past-president of N.S.G.A.

It was voted that one of the two N.S.G.A. fellowships would be set aside for a year at Purdue University where the Fellow will study bituminous mixtures. Among other topics considered were stream polution, labor legislation, two-way radio and percentage depletion. The annual short courses, group insurance and other topics were considered in the joint session, where Executive Secretary V. P. Ahearn also presented his annual report to the two associations.

The general sessions covered three and one-half days and included five joint sessions in addition to separate sessions for the separate industries. Special meetings included a conference of executives of state and area associations, a breakfast meeting of the Ohio Ready Mixed Concrete Association, and an informal discussion on the use of equipment of the two industries by Civil Defense Agencies for firefighting in the event of bombing attacks in this country. A resolution to cooperate was prepared as a result of this discussion and presented before the two boards of directors.

At the conclusion of the convention sessions there was a luncheon get-together meeting of the N.R.M.C.A. board of directors. Each evening there was a hospitality hour, planned so that delegates could have a common meeting place to plan get-togethers. There was one scheduled joint luncheon at which there was a featured speaker and where presentation of a certificate of honorary membership for life on the board of directors, N.R.M.C.A., was made to Stephen Stepanian. This year, the addresses of the two presidents were given at separate sessions of the two industries.

Reports of special interest to producers of ready-mixed concrete and certain subjects covered in joint sessions are published in the CONCRETE PRODUCTS section of this issue, where the principal report of the N.R.M.C.A. convention is published. This report, of the N.S.G.A. meetings by necessity also covers many topics of interest to ready-mixed concrete producers as they were presented in joint sessions.

Albert R. Shiely, retiring president of the N.S.G.A., presided for the opening session where he presented his presidential address and awarded the ROCK PRODUCTS safety trophies. President John W. Murphy was presiding officer for the second session which was a joint meeting. J. Rutledge Hill, Charles E. Brady and Enic A. Goodman, Jr., presided for other N.S.G.A. sessions; retiring president Herbert G. Jahncke, Richard K. Humphries and President-Elect, Robert C. Collins were chairmen for separate ready-mixed concrete sessions; and William Moore, Paul J. Kremer, Howard W. Jordan and Robert Mitchell were chairmen of the other joint sessions.

Officers

John W. Murphy, Union Sand and Gravel Co., Spokane, Wash., was elected president of the National Sand and Gravel Association to succeed Albert R. Shiely. Roy E. Weaver, Lincoln Sand and Gravel Co., Lincoln, Ill., was elected vice-president and E. Phil Gemmer, Texas Construction Material Co., Houston, Texas, was elected secretary-treasurer. Elected to the executive committee were Robert H. Baker, Dixie Sand and Gravel Corp., Chattanooga, Tenn.; E. K. Davison, J. K. Davison & Bro., Pittsburgh, Penn.; Howard W. Jordan, Metropolitan Sand and Gravel Corp., Port Washington, Long Island, N.Y.; and Harry E. Bender, Azusa, Calif. The officers complete the executive committee.

Elected directors at large were Charles E. Brady, Lilesville, N. C.; Robert S. Barneyback, Oakland, Calif.; J. Paul Calhoun, Columbus, Ga.; C. A. Chipley, San Antonio, Texas; and Irving Crown, Material Service Corp., Chicago, Ill.

President's Address

President Albert R. Shiely, in calling the opening session of the N.S.G.A. to order, expressed his pleasure with the successful convention, the manufacturers' exposition and the fine work of the Washington staff. He reported that 22 new members and 13 associate members had been added since the last convention, bringing the total to 249 acting members and 84 associate members. He commented on the fine working relationship with the National Ready Mixed Concrete Association, the National Industrial Sand Association, the Manufacturers Division and the University of Maryland where association research is conducted. He expressed his thanks to the various committees and individuals responsible for progress this past year.

Mr. Shiely then turned to a discussion of the attempts by the Republican party to bring the nation back

Another view of exhibits in the main exhibit hall at the Conrad Hilton Hotel

to a sound course after many years of high taxation and other activities that were leading the country in the wrong direction. He emphasized that security is no substitute for happiness but the striving for security accomplishes that end. He said that the new administration in Washington needs help to reverse the trend, and reminded his audience that it is our problem and obligation to sell America to the younger generation.

Executive Secretary's Report

THE ANNUAL REPORT OF EXECUTIVE SECRETARY, V. P. Ahearn to the two associations was voluminous and was not presented at the general sessions. Rather, he touched upon the highlights before the joint luncheon meetings of the two boards of directors.

Mr. Ahearn's report started with a detailed discussion of the construction situation in 1953 and prospects for 1954. New construction totalled $34.8 billion in 1953, according to his figures, which represented a new all-time record for dollar volume and physical volume as well. The estimate for 1954 is that $34 billion will be spent for new construction. Whereas private housing and industrial, farm and defense construction likely will decline, the declines will be offset because of extensive accumulations of construction required to accommodate the great increase in population including utilities, stores, schools, churches, highways and streets. The highway building program is expected to show continued increases.

The sand and gravel industry is producing at a rate in excess of 400 million tons annually, and records available for recent years reveal a steady increase. From 1939-1952 inclusive, the sand and gravel industry has produced more than 4 billion tons which, he said, is depleting reserves at a rapid rate.

According to a survey by the N.R.M.C.A., the industry produced concrete valued at $690 million in 1952 requiring 76 million barrels or one-third the output of the portland cement industry. Output for that year apparently was 60 million cu. yd. of concrete with an average price of $11.49 per cu. yd.

There were some local shortages of cement in 1953, and the ready-mixed concrete industry has suffered somewhat because expected price protection from the cement industry did not materialize. The industry is committed to a policy of cementing its good relationships with the cement industry for mutual benefit.

The principle of percentage depletion will be under attack, in Mr. Ahearn's opinion, and the sand and gravel industry must be prepared to defend its position. The 3-percent tax on the transportation of property for hire will likely be continued for some time, he said.

The sand and gravel industry has not been subjected to renegotiation, and it is Mr. Ahearn's hope that the ready-mixed concrete industry may yet be freed from provisions of the law.

State tax programs are becoming increasingly serious, he said, pointing as an example to severance tax bills which have had to be fought in many states. Taxes imposed on the operation of trucks are growing and present bookkeeping problems almost as great as the taxes themselves. The associations have cooperated with state and area associations in these matters.

Mr. Ahearn touched upon the problems of zoning, air and stream polution and land rehabilitation which are growing in seriousness. The best approach to forestalling zoning policies which impose undue burdens, he said, is for company executives to help create a favorable climate of local opinion about the essential role which the two industries play.

Provisions of the Wage and Hour Law were reviewed, and Mr. Ahearn commented at some length on the serious strikes affecting the industries, particularly in Mobile, St. Louis, Kansas City, New Orleans and New York City. The Teamsters Union was involved in each and the strikes were prolonged and bitter. In his opinion, they were all avoidable. The lesson learned from these strikes, he said, was that when employers are organized, much more favorable results are obtainable in the settlement. The associations continue to provide their membership with authoritative information about developments to aid in collective bargaining and the handling of strike problems. The desirability of keeping employes informed about their own companies by companies themselves was advocated by Mr. Ahearn. A bill in Congress that would have prohibited industry-wide bargaining was opposed by the two associations, and it apparently has been defeated.

Vince Ahearn, executive secretary

The jointly-sponsored group insurance plan is proving successful, he said, and participation in the plan continues to grow. The N.R.M.C.A. will soon revise and reissue its "Your Job" manual. The N.R.M.C.A. has just reissued its 6-year-old publication on standard clauses for sales agreement. The N.S.G.A. has filed a further brief with the F.C.C. in the interest of obtaining the use of industrial radio for sand and gravel truck operations.

Mr. Ahearn is pleased at the growing participation in the N.R.M.C.A. safety competition, but expressed his disappointment at the relatively few who participate in the N.S.G.A. competition. He urged strongly that the industries take more interest in accident prevention, both for humanitarian reasons and in order to forestall the growing increases in workmen's compensation insurance rates.

Mr. Ahearn looks forward to a good business year in 1954, but one which will be a challenge to good management as competition grows.

Atomic Energy Program

The Hon. W. Sterling Cole, chairman, Joint Congressional Committee

New officers of N.S.G.A., left to right: John W. Murphy, president; Roy Weaver, vice-president; and E. Phil. Gemmer, secretary-treasurer

Hon. W. Sterling Cole, chairman of the Joint Congressional Committee on Atomic Energy, and one of the luncheon speakers

on Atomic Energy, who spoke on "The Legislative Aspects of the atomic energy program, was one of the feature luncheon speakers.

"Ordinarily, you would not consider the industry you are engaged in would have a close connection with atomic energy," he said, "however, the mere idea of atomic energy alone is useless by itself. It must be reduced to brick, steel and concrete, and manufacturing plants."

To discuss atomic energy at this city is appropriate, he continued, for it was in Chicago 12 years ago that the chain reaction theory was proven.

The results of a thermo-nuclear test in 1952 completely obliterated an island in the Eniwetok Atoll. The size of the cavity created by this blast, he said, was such that 140 buildings the size of our national capitol could easily be placed within it. This is the appalling meaning of the hydrogen bomb.

We are now in an era into which one plane, carrying one hydrogen bomb can place on a target the combined destructive forces exceeding all the T.N.T. dropped upon Germany, Japan and Italy throughout the entire World War II.

In conclusion, Rep. Cole said, "Whether we like it or not, we are a part of the atomic world, and in the days ahead, upon the acts of our elected leaders, will depend the future of untold generations. With the dedication to the cause of good, may we act wisely that atomic energy shall be the beginning of a golden future, not the tombstone of mankind."

Safety Winners

PRESIDENT A. R. SHIELY presented the ROCK PRODUCTS safety trophies to winners of the 1952 safety competition, at the opening session of the N.S.G.A. Winners of the trophies were the Eliot No. 104 plant of Pacific Coast Aggregates, Inc., San Francisco, Calif., in the class A competition for plants operating more than 100,000 man-hours; the West Des Moines plant of Concrete Materials Co., Waterloo, Iowa, in the class B competition (50,000-100,000 man-hours); and the Bennett plant, Thomas Gravel Co., Fort Worth, Texas, in the class C competition for plants operated less than 50,000 man-hours.

President Shiely presenting safety trophy to Leo Bunds of Pacific Coast Aggregates, Inc., winner in Class A for the Eliot No. 104 plant

Following the presentations, a representative of each trophy-winning plant briefly discussed its safety policies.

Leo Bunds, superintendent of the Eliot plant of Pacific Coast Aggregates, Inc., said that the company's safety policy was responsible for winning of the trophy, and that it largely stems from the leadership of top management and complete teamwork through the ranks. Among some of the practices enumerated by Mr. Bunds were the following:

"1. All employes are required to take a physical examination before going to work.

"2. Each new employe has his new duties fully explained to him before going to work. In addition, he receives one of our company safety manuals fully explaining our safety program.

"3. Each new employe has one of our older and experienced employes work with him until we are sure that he fully understands his new duties and understands the safest method of doing the work.

"4. Employes are instructed to report all accidents to the office, on the day they happen. We do very little first-aid work at the plant. We have found it better to send the injured to the doctor's office for first aid. Employes that fail to report accidents to the office on the day that they happen are forced to lay off for one week without pay.

"5. We make a complete investigation of every accident, and the responsibility and cause of all accidents are determined.

"6. Thirty-minute safety meetings are held each month, where previous accidents are discussed and new safety instructions are given by the plant superintendents.

"7. We make it a point to follow up on accidents while the injured employe is at the doctor's office. We have found this follow-up to be very helpful in the preventing of lost-time accidents.

"8. Our company safety engineer mails each of our plants a summary of personal injuries that cover all the company plants and retail yards. We attach this report to our bulletin board monthly.

"9. We keep posted on our bulletin board the total number of days the plant has worked since its last lost-time accident.

"10. We have a program of awarding the plant that works for one year without a lost-time accident a big dinner and one big night of fun for all. The fellows all have a good time and talk about these dinners for months.

"11. We have a set program in keeping our plants, grounds and buildings clean and in an orderly condition at all times. I think that good housekeeping covers 95 percent of our safety program."

F. E. Bellamy read a paper prepared by W. W. Roberts, production

F. E. Bellamy, left, and Howard Barnett, Concrete Material Co., Waterloo, Iowa, receiving safety trophy as the Class B winner, West Des Moines plant

manager, Concrete Materials Co., Waterloo, Iowa, detailing some of the company's safety practices. Mr. Roberts expressed great pride in winning the trophy particularly because the West Des Moines plant is a dredging operation which company records had shown to be more hazardous than its other plants.

A program to make employes more safety conscious was accelerated two years ago as a result of an increasing number of accidents. It was decided to create a competitive interest between the various plants. Accident record boards were placed at each plant showing its safety record and those for the other plants. The signs are kept current and have been effective in creating a competitive interest. At the close of the calendar year a cash prize is offered the plant with the best record to be spent as the employes decide. The winning plant in 1952 spent the money for a group family picnic.

Another plan is the holding of production management conferences attended by plant superintendents and their office men along with general office and top management personnel. Recently, the company's compensation insurance carrier has arranged to present annual safety awards at the production-management conference each year, which is another competitive angle. These awards go to those plants with no lost-time accidents for the year and to those showing an improvement in accident frequency over the prior year.

The company has embarked upon a program to constantly stress safety to all supervisory personnel who in turn emphasize its importance to the individual employe. It believes the basis of any safety program to be the education and training of the individual employe safety-wise. Superintendents and foremen talk safety constantly. They call attention to such accidents as they read about and stress the hardships arising from the accident to the victim's family. The removal of safety hazards around the plants is a never-ending program. In conclusion Mr. Roberts expressed confidence that the safety program is sound and that the record will be further improved.

The safety program of the Thomas Gravel Co. was outlined in a paper prepared by Production Superintendent W. R. Thomas. This company has had an outstanding record over the years in its various operations. The company places safety on a par with production as a means of gaining operating efficiency and its management has assumed the responsibility for safety of its employes. Top management has seen to it first that safe working places be provided and has assisted its supervisory staff in ways of eliminating the physical exposures by:

1. Selection of personnel to fit the particular job.

Lloyd B. Thomas, Thomas Gravel Co., Fort Worth, Texas, accepting safety trophy as the winner among Class C companies

2. Setting up safety rules for each job or plant.

3. Placing the responsibility for safety on each plant superintendent and foreman.

4. Inaugurating a daily routine of job inspections for production and safety.

To prove that safety pays dividends, Mr. Thomas cited the records from three company plants. The Quigley plant won its first Certificate of Merit for no lost-time accidents in 1933. It has won a total of nine such certificates and was awarded a ROCK PRODUCTS trophy in 1944. In 1953, it had no lost-time accidents.

The Kingsbury plant started operation in 1950 and won the trophy in the small plant classification for its first year. Certificates of Merit were awarded in 1951 and 1952.

The Bennett plant was first entered in the competition in 1948. It was awarded the trophy in 1949 and again for 1952. Four of its six years in production have been with no lost-time accidents and it ended 1953 with another perfect record.

Safety meetings have been changed from long meetings held at 30- to 60-day intervals to weekly meetings cut to about 10 min. in order to hold the interest of the men and the results have been excellent. The foreman or superintendent of a plant is in charge of these meetings and one or two subjects are covered per meeting. Worker participation has increased as a result. At each weekly meeting one employe is elected "safety engineer" for the following week. This applies to all employes in a rotation and the man is given a red and white badge, 3 in. in diameter, to wear. This employe has the authority to correct or report any one he sees violating safety rules. He also is given authority and requested to report any hazards. This idea has created a great interest in safety.

The company has its own paint shop for printing safety signs and keeps them posted at all plants.

A lively discussion on safety followed these talks. In answer to a question as to the reaction of the unions to the practice of penalizing a worker with a week's enforced layoff for failure to report an accident, Mr. Bunds said that the unions suggested the penalty. There was interest expressed in having moving pictures and slides on safety prepared for showing at plants.

Harold Koop, safety engineer of Lyman-Richey Sand and Gravel Corp., Omaha, Neb., which has had an outstanding safety record, was asked to comment. He cited the company record and the stress on making workers part of a company team. Fred Curtis of Lyman-Richey commented that Mr. Koop started with the lowest job in the company and worked up through all production jobs, which provided the opportunity for him to know the hazards of each job. He gave the credit for consistently fine safety records to Mr. Koop.

Percentage Depletion

J. RUTLEDGE HILL, who had much to do with gaining percentage depletion benefits for the sand and gravel industry, presided over a N.S.G.A. session largely devoted to that subject. He opened the discussion by reminding the members that every load of gravel taken out of a deposit is a step toward putting the producer out of business. Percentage depletion is needed as a result, and it can be proved necessary to stay in business. Personal contact with congressmen continues to be needed, in the matter of percentage depletion, he said.

Paul Kremer, The Buffalo Slag Co., Inc., Buffalo, N.Y., was the first of two scheduled speakers on methods of applying the principle of percentage depletion. Mr. Kremer commented principally on application of the general regulations. The most complex problem in percentage depletion is in accounting procedure, he said, because few accountants understand the problem. He said that it is simple where a producer owns the property and must only multiply the gross income by 5 percent to arrive at the depletion allowance. He pointed out that cost depletion can be taken, if it is greater than percentage depletion. Should a company have $200,000 sales and there be $20,000 paid in royalties and rents, the depletion figure would be 5 percent of $180,000, according to an example given.

One of the biggest problems, he said, is in the case of small producers who have no accountants. Such producers, he suggested, should seek help from their local Chamber of Commerce. A large number of such producers, in his opinion, have done nothing to getting these legitimate benefits. He reminded that if a company is set up on a calendar basis, that it has until March, 1955, to apply

for a refund on its 1951 return. In the case of fiscal year records, statutes of limitations in the various states will determine whether refunds may be allowed on earlier returns.

Methods employed by his company in applying the principle of percentage depletion were discussed by John W. Murphy, The Union Sand and Gravel Co., Spokane, Wash. At the outset, Mr. Murphy said that there are apparently many producers who are not taking advantage of percentage depletion for tax purposes who are entitled to do so. He urged that producers become thoroughly familiar with the law so that they can intelligently discuss the matter with their attorneys or tax counselors.

He briefly reviewed some of the more significant provisions in an "over-simplified" manner as follows:

"(1) A sand and gravel producer under many, and indeed most conditions, may take the 5 percent percentage depletion even if he does *not* own the land upon which he operates.

"(2) The tax deduction for percentage depletion is based on your gross income from the property and not on the cost or other basis of the land. If you are entitled to percentage depletion, you are able to take it even if your land has been completely depleted by cost or other depletion.

"(3) You are always in any given year permitted to take the larger of percentage depletion or cost depletion. It is not necessary to make any formal election as to which method you wish to use and the method may be changed each year if that would be advantageous to the producer.

"(4) Percentage depletion gives the producer a definite incentive to run a profitable operation, as the amount of allowable percentage depletion may not exceed 50 percent of the net income from the property. Thus, if your net income from a given sand and gravel operation is low you are apt to lose part of your percentage depletion allowance. Cost depletion on the other hand does not have the 50 percent limitation."

The Union Sand and Gravel Co., an operating company, is a partnership of three and operates entirely on leased ground. The ground is owned by a corporation which is an operating ready-mixed concrete company, with three stockholders who are the partners of the Union Sand and Gravel Co. The books of both organizations have not been audited since the 1951 tax return so, Mr. Murphy said, his remarks were not authoritative. What has been done in filing tax returns has, however, been done so that it is believed such action could be defended with an Internal Revenue agent.

The company had no written lease so that situation was immediately corrected. The company has two operating plants, eight miles apart, and prices are identical at the two plants. Much of the sales are delivered by truck with the balance sold f.o.b. customer's truck or f.o.b. rail car. One of the plants produces only concrete sand and gravel; the other also produces "crushed rock" for surfacing material and bituminous mixtures.

In setting up the gross sales figure, the portion of the sales which is the truck delivery charge where delivered in company trucks is not kept separate. The reason for this is that average cost of delivery has been more than the delivery charge. The two figures are close so that as a deduction from gross income, before delivery expenses, delivery costs have been deducted. This practice, Mr. Murphy believes, can be successfully defended.

The operating company pays the land owner royalties, which are deducted from the gross income from the property. With respect to the deduction which must be made for any processing costs or other costs incurred after the product has reached the first commercially marketable stage, Mr. Murphy told how this was being handled. At the plant where "crushed rock" is produced from gravel greater than 2-in. size, he is not deducting the costs of crushing.

The position is taken that there is no sale for that amount of gravel until it has been crushed. If it were crushed for concrete aggregate there would be an excess over demand. This deposit is predominantly to gravel and the sand is very deficient in fines with only 5 percent passing 30 mesh. To use this sand for ready-mixed concrete, a very fine second sand must be used. The part that cannot be used by the mixing plant can only be made commercially marketable by adding a blending sand. The cost of blending is not being deducted.

At both plants considerable production is placed in storage for winter use. The cost of putting this material into storage and reclaiming from it is not being deducted on the belief that this material is not commercially marketable when the demand develops for it during the winter months.

In contrast to the majority of plants, the operating sand and gravel company does not show depletion on its books because it does not own the land.

In conclusion, Mr. Murphy said that the industry should take the deduction for the maximum amount that can be reasonably and logically justified. If wrong, all that can be lost is the interest on extra income taxes.

Percentage Depletion Regulations

John T. Sapienza, counsel for the two associations, concluded the discussion on percentage depletion by bringing up to date latest thinking on the subject in Washington. While revenue legislation is undergoing much revision, no major changes in percentage depletion regulations are contemplated at present, he said. The Treasury Department is studying the ore and mining industries, however, and industries which have percentage depletion must be on the alert and know their congressmen, he reminded. They must be informed about the industries involved. Gypsum and certain other minerals are to be added to those which are entitled to percentage depletion.

The end use test will be applied, as will the earliest possible cut-off point in producing a commercially marketable product, in determining the permissible tax deduction. The system of nine regional offices of the Internal Revenue Service is being set up to rule on cases.

No decisions have yet been made under the Revenue Act of 1951 which provided for percentage depletion, so the sand and gravel industry has no definite rulings available for its guidance. Two cases are now in the courts involving clay brick and tile producers, with the cut-off point as the main issue. The clay has no value in this case except as it is processed into brick or tile. In the case of talc there has been a ruling that the material must be pulverized before it could be commercially marketable.

Mr. Sapienza said that producers should resolve all reasonable doubts in their favor. Should they take less deduction than entitled to, they would never get more, he said, and if they take more than allowed the penalty would be to pay the difference in taxes plus interest on the unpaid amount.

Compensation Insurance

Speaking before a N.S.G.A. session, Theodore C. Waters, counsel for the National Industrial Sand Association, covered the subject of Workmen's

Left to right: Herbert C. Cullison, Mrs. Herbert C. Cullison, Mrs. Ross Hoffman and Mr. Ross Hoffman, Harry T. Campbell Sons' Corp.

Compensation Insurance Rates and suggested a course of action for producers to follow.

He traced the development of compensation laws and brought out the differences in State laws with respect to coverage, requirements, injuries payable, benefits and procedures. Every year, he said that countless bills are being introduced in state legislatures with respect to compensation laws. The trend is to liberalize the laws, extend the benefits, increase liability and to introduce new concepts of injuries and payments. Originally enacted to provide for accidental injuries, amendments and interpretations to the laws have greatly enlarged their scope.

Mr. Waters warned that it is the employer's responsibility to provide safe working places for employes and that it is good business to do so.

The idea of compensation is for disability, but the question is the definition of disability and several concepts have arisen. Whereas loss of wages was once the most important consideration, it apparently is assuming secondary importance and incapacity to work is getting the play.

Legislative amendments which increase monetary benefits have resulted because of the increasing standard of living and little can be done about that, said Mr. Waters. Employers should become more interested in State legislative matters in order that unreasonable bills not be passed. The tendency to grant compensation irrespective of wage losses or inability to work now has taken the form of health insurance although that was not the purpose of compensation laws.

Another extremely important development in compensation, he said, is growing rapidly and that is in the field of the effect of noise as it may impair hearing. Thinking in this direction is spreading nationally, and it is extremely difficult to defend against claims in the absence of adequate physical examination data for the purpose of comparison.

Compensation for Salesmen

ONE OF THE TWO PAPERS on the subject, "Methods Employed in the Compensation of Sand and Gravel Salesmen," was presented before the merchandising session of the N.S.G.A. by Robert F. Porter, vice-president in charge of concrete and building material sales, Harry T. Campbell Sons' Corp., Towson, Md. Mr. Porter is a strong believer in the need for continuous promotion and selling, and his presentation covered principally the organization of a sales department and the development of a philosophy of salesmanship. He referred to his own company's practices to stress his points.

Mr. Porter's company believes that in selecting a sand and gravel salesman, he should be an engineer or at least technically trained, that he should be from 23 to 30 years of age and willing to work. He is never put on the road immediately but is put to work in the scale office and around the plants for at least six months so that he learns about production and becomes sold on the company and its product.

The company has a group insurance and hospitalization plan, providing salesmen with protection against costly illness or accidents off the job, covering the employe, his wife and children. Employment compensation pays for hospitalization due to accidents on the road. Salesmen are provided with adequate expense accounts for use in establishing good salesman-customer relations. The company is constantly buying tickets to banquets and luncheons so that salesmen can be in close contact with sand and gravel buyers.

Also stressed was the desirability of establishing and maintaining friendly relations with competitors. Experience has proved, he said, that a company can make more money selling harmoniously with a competitor than trying to "cut his throat."

Mr. Porter then discussed the philosophy of selling. Selling was defined "*good old-fashioned* hard work." Assuming a good product, he said that selling becomes a matter of full and thorough knowledge of the product, full knowledge of the customer and his needs, and then an intelligent and sincere presentation of the facts to as many genuine prospects as possible. It is the sales executives' responsibility to direct salesmen to genuine prospects and to see to it that they call on a maximum number.

Salesmanship was classed as a profession that must be learned after which good, old-fashioned hard work is the answer in gaining sales. The sales executive's job is to supply the spark to keep the salesmen going. During times of recession, selling is too often the first activity to feel retrenchment, he said, when it should be the last to be cut.

In closing, Mr. Porter stressed the great need for developing a philosophy of salesmanship and he reminded that the industry is now in an era far removed from the practice of just taking orders.

Selling and the Salesman

Charles E. Brady, Lilesville, N. C., discussed "Sales, A Policy or an Accident" and made reference to the need of a written quotation, especially if material is sold for road building purposes. Following, and implementing the quotation form, should be a sales contract, which should be filled out at the time of sale to prevent any possible misunderstandings. He called attention to the "Standard Clause for Sales Agreements" published by N.R.M.C.A. and said that it could act as a base for building an individual quotation and sales agreements. Mr. Brady told about development of a sales philosophy. He said "We are not satisfied with our sales program—we are satisfied with our sales philosophy." One facet of this philosophy is not only to sell but to keep it sold, and pointed out that a salesman has a function to perform as an expeditor for the buyer.

Most salesmen, he said, prefer to have a definite understanding as to what is expected of them in the way of entertainment. Mr. Brady said that his company had found it very effective to choose guests (for a party) with similar interests.

Quentin W. Best, vice-president, Consolidated Rock Products Co., Los Angeles in discussing "Methods Employed in the Compensation of Sand and Gravel Salesmen," grouped compensation methods under three headings: (1) straight commission; (2) salary plus incentive bonus; and (3) straight salary. Mr. Best preferred the latter method or straight salary for salesmen for under this arrangement the salesman is a vital part of the team, and will try to get the business regardless of who gets the credit for it, and when business is booming (and a customer has to be given a preference) a salaried salesman will tag along better with the management's decision. Mr. Best's observations on methods of compensation for sand and gravel salesmen apply equally well to other segments of the rock products industries.

Left to right: Paul J. Kremer, Buffalo Slag Co.; Carleton J. Lewis, Buffalo Gravel Corp.; and T. J. Rodgers, Federal Portland Cement Co., Inc., all of Buffalo, N.Y.

Group Insurance

DONALD SHEPHERD, John Hancock Mutual Life Insurance Co., Boston, Mass., explained the advantages offered by the group insurance plan of the two national associations.

The group insurance plan, he said, is one that was considered after a two-year period of investigation and careful study on the part of the Committee on Group Insurance of the N.R.M.C.A. The committee recommended to the board of directors that the association should sponsor a group insurance plan for its members and their employes.

Kenneth Tobin, assistant executive secretary

The main purpose of this undertaking, he said, was to provide a program for the members that would make group insurance available at the lowest possible cost, greatest benefits to be derived, greater scope of coverage, and to permit employes to institute in their own companies an insurance plan that would add to the employes' morale.

Year's Experience

The first year of the plan was reviewed by Kenneth E. Tobin, Jr., assistant executive secretary and group insurance administrator.

The N.R.M.C.A. group insurance plan became effective on April 1, 1953, and the petition for a joint N.R.M.C.A. and N.S.G.A. group insurance plan became an accomplished fact on May 1, 1953.

The present enrollment includes 27 companies and the associations' staff (729 employes and 470 dependents). This breakdown figure shows 134, Class I; 580, Class II; 3, Class III, and 12, Class IV. Distribution of dividends for this operating period amounts to $8585. Cost of administration for the same period was $10,500 ($2250 waived). Included in the breakdown cost are: (1) non-recurring expense $5000; (2) normal operational expenses $5500; (3) $1500 loss due to rate difference in 1953.

Claims, he continued, are efficiently handled by the staff and, in most cases, were paid within 24 hr. with the exception of questionable claims. Up to December 31, 1953, there have been 173 claims paid out amounting to $12,000. These, he added, were all for hospitalization, surgical and medical cases. To date there have been no claims for death or polio.

Taft-Hartley Act Applied to Group Insurance

Application of the Taft-Hartley Act to group insurance and pension plans was outlined by W. Crosby Roper, Jr., counsel for the two associations.

The surprising fact about group insurance and pension plans under the Taft-Hartley Act, he explained, is the small number of decided cases that deal with the many potential problems in the field.

One clear-cut case dealing with the health and welfare and pension plans subject to collective bargaining was established with respect to pension plans in Inland Steel Co. vs. N.L.R.B. 170 F. 2d 247, and with respect to health and accident plans in Cross and Co. vs. N.L.R.B. 174 F 2d 875.

Section 302 of the Taft-Hartley Act, he continued, is a criminal provision with any willful violation being punishable by a fine of not more than $10,000 and imprisonment for not more than one year. Section 302, he explained, makes it unlawful for an employer to make any payments to a representative of his employes or for a representative to accept such payments, with certain specific exceptions, these being, a defined basis for payments and annual audits.

One problem faced by the employer representatives is that they are trustees. The beneficiaries of these funds are not the employers, or the unions, but the employe for whose exclusive benefit the funds are established. Therefore, as in the case of criminal liability, he added, this possible liability for breach of trust cannot be lightly dismissed.

Group Bargaining Techniques

W. Crosby Roper, counsel for the two associations, discussed "Techniques in Group Bargaining by Employes Under Existing Statutes and Court Decisions," in the closing session.

"The most that I can do," Mr. Roper said, "in discussing this topic is to describe certain problems which arise under the statutes and court decisions, and to make tentative suggestions. The real technique starts where I leave off."

The major development in the past year was the definite indication that the reconstituted N.L.R.B. abandoned the view that the multi-employer lockout is not a legitimate weapon.

Regarding the question of what type of employer organization is best suited to the purpose of multi-employer bargaining, Mr. Roper stated there is a wide variety of arrangements.

National Affairs

At the close of the regular schedule of speakers, John W. Murphy, presiding officer, presented Vincent P. Ahearn, executive secretary, who delivered a brief "bonus," speech.

Touching on the highlights of the Republican regime, Mr. Ahearn spoke of President Eisenhower's popularity, and increased political stature, which he attributed to the president's sense of devotion and consecration.

Among the President's worries, he stated, was the farm problem, the business decline, and the coming November elections. His dislikes, he continued, included political violence, Sen. McCarthy, labor strife, patronage, speeches and press conferences.

Cost Accounting

Three papers all related to "Development of Accurate Cost Accounting Systems in the Sand & Gravel and Ready Mixed Concrete Industries, Including Sound Depreciation Policies," were presented. Chairman Paul J. Kremer, The Buffalo Slag Co., Inc., Buffalo, N.Y., said cost accounting is divided into two categories for a manufacturing business; process cost accounting, or job order cost accounting. For the rock industries, Mr. Kremer preferred process cost accounting. He divided his company's operations into "cost centers" or departments, and included stripping, excavation, transportation, and plant operation, the latter being broken down further by combining crushing, washing, and screening in one cost center which he called the crushing and screening department. Other cost centers are storing and reclaiming, and finally the general department. These cost centers are all at the plant level, and do not include administrative, sales, or general office cost items. The general department cost center carries such items as superintendents' salaries, watchmen, office salaries and such items that are difficult to charge to a particular department.

John W. Murphy, Union Sand & Gravel Co., Spokane, Wash., in his paper dealt with the essential needs of cost accounting. The speaker said that cost accounting is not a system of bookkeeping, but a system of operation and per se did not originate with the accountant but in the operating departments. Mr. Murphy cautioned against accumulating a lot of figures that no one looked at or studied. He felt that cost accounting could tell top management if it was more economic to do their own stripping, or contract it; with two gravel plants using similar equipment, one foreman may be operating at a much lower unit cost and corrective measures then taken. Cost accounting can help in labor negotiations for management can reflect into cents per ton proposals to raise certain craftsmen in cents per hour. This was given emphasis. In closing, Mr. Murphy said:

"Adequate cost accounts and constant policing of them is the only way to hold down overhead costs we all have. Without constant attention no one can prevent them from creeping up as years go by. Without cost accounting the increase would never be noticed."

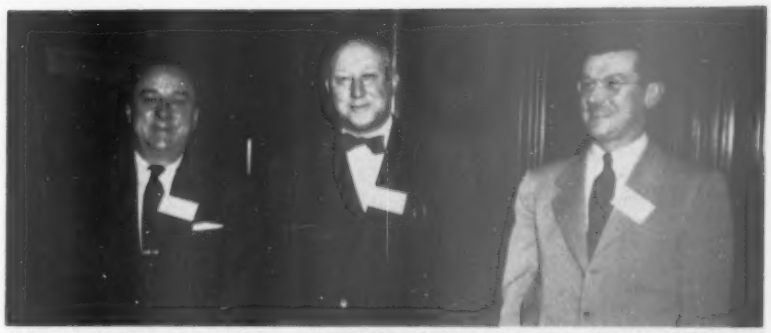
Labor Distribution

Eugene J. Halter, assistant secretary-treasurer, J. K. Davison & Bro., Pittsburgh, Penn., presented a detailed analysis and description of his company's cost accounting system. It is a dredging operation producing about 1,000,000 tons of sand and gravel annually and 50,000 cu. yd. of ready-mixed concrete. The company employs 150 to 180 people with eight devoted to payroll, billing, and accounting duties.

Mr. Halter said the company books were closed monthly for financial statements with cost statements prepared on a quarterly basis. Cost centers are Dredging, River Transportation, Hoisting, Binning and Weighing, Cement Handling, General Yard, Testing, Service Department, Truck Transportation, and Office, Sales and Administrative Expenses. He described the sub-divisions of each cost center and methods of allocation to each.

In describing their system of labor distribution, Mr. Halter said:

"My company has from 135 to 165 labor payroll employes, which are scattered over 10 different locations; we have seven union labor contracts, as well as some groups of personnel that are non-union. Each work location is equipped with a time clock, and time cards are prepared in advance covering two-week pay periods. One of the forms distributed is our time card, which you will note is punched on one margin with 48 numbers, each number representing a specific job classification at a particular work location. The foreman of each crew is responsible for the time card supply for his men, and each set is pre-punched for the normal occupation of each man; for instance, a hoisting engineer at our plant in New Kensington has number "22" notched or punched in the example handed you, which would be his normal occupation. Every time clock location has a job code list, with a job description of every possible labor operation at that particular location. If he is temporarily assigned to a job other than his normal one, he indicates in the right hand column marked "Job No." the number of hours spent on the temporary job. When the cards are sent to the general office at the end of a pay period, his wages are computed on the time card and pay checks issued on a National Cash Register payroll machine. After checks have been issued, the paymaster examines the cards for distribution, making additional notchings for any variation from normal occupation. I might add that some employes will have four or five labor classifications each pay, indicating that we do keep fairly accurate account of distribution. When all classifications have been indicated by notching the cards, they are "needle-sorted" by jobs and an adding machine tape prepared for each group such as Dredging, Towing, Hoisting, etc., and balanced with the total shown on Gross Payroll on our payroll machine summary accumulated when the checks were prepared. We have found that our labor distribution is much more accurate, and have been pleased with the results since its installation three years ago."



A New York threesome: E. J. Nunan, Buffalo Slag Co., George R. Krom, Windsor Building Supplies Co., Inc., and Edward P. Kolb, Buffalo Slag Co.

Employe Stock Plan

Richard K. Humphries, vice-president and general manager, described the "Employe Stock Plan of Pacific Coast Aggregates, Inc." This is a program set up by his company whereby employes can buy common stock and pay for it via payroll deductions. He said that 168 employes out of a total of 700 had joined the plan and eventually one-eighth of the company will be owned by employes.

The plan started March 1, 1953, to run for five years. The management can end it sooner if unexpected good reasons come up. Any employe can come in after being an employe for three months. He can come in at any time during the plan's life. He can cancel out whenever he wants to. But if he does, he can't come back in for at least six months more. Employes pay $10 per month or any higher multiple of $5 monthly. The money is deducted from the pay check. The employe can raise or lower the amount, but it must not be less than $10 per month. If lowered, the employe cannot raise it for six months.

Business Prospects

AT THE CONCLUDING JOINT SESSION, an informal discussion of business prospects for the two industries was held, with the discussion led by 11 members of the industry. The discussion leaders represented all parts of the country geographically and, in each case, had surveyed their respective areas in advance. Taken overall, 1953 was an excellent year and there is optimism that 1954 will continue to be a good year for business.

Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif., said that the year 1953 climaxed the biggest construction year in history for southern California. He predicted that 1954 volume would be 10-15 percent less, but may turn out better than that. There are signs of levelling off which presents a challenge, he said, but highway and utility construction will continue at a high rate.

R. S. Barneyback. Henry J. Kaiser Co., Oakland, Calif., said that 1953 was about equal to 1952 which was the greatest in history, and he predicted that 1954 would be as good a year for producers as 1953.

Fred E. Bellamy, Concrete Materials and Construction Co., Cedar Rapids, Iowa, predicted that volume of ready-mixed concrete and sand and gravel will increase in 1954, but that there would be no improvement in profits. As far as ready-mixed concrete is concerned, industrial and municipal building will be up and residential construction will equal 1953 or be slightly less. Prices will remain the same, but costs will be up and the increases absorbed. Collections are becoming more difficult.

Commenting on sand and gravel, he said that highways and city paving will increase. Many small new producers are aggravating the problem competitively with the result that prices will decline. The need will be for greater efficiency in operations.

Arthur J. Bryce, Certified Concrete Co., St. Paul, Minn., reporting for the north central area, predicted that volume of business would increase over 1953 in 1954. Many large industrial projects are to be built and the taconite development is helping the entire area, with many new cities springing up. Practically all types of construction will show an increase and, barring strikes or labor shortages, the prospects are bright.

E. K. Davison, J. K. Davison & Bro., Pittsburgh, Penn., presented construction figures for various sections of the country and pointed to

A group from Pennsylvania. Left to right: A. I. Martindale and F. V. J. Haggerty of Warner Co.; A. R. Ames, A. R. Ames Co.; and E. L. Shoemaker, J. D. Dungan and Herman M. Egner, Warner Co.

the lower interest rates for various types of building and more readily available financing as favorable factors. He touched upon the construction momentum carrying over into 1954 and said there was a healthy, steady tonnage demand ahead.

E. P. Gemmer, Texas Construction Material Co., Houston, Texas, said that volume of business in his area in 1953 exceeded that for 1952 but that prices were too low. Competition is expected to stiffen but tonnage is expected to increase in 1954. Permits in Houston and the county are ahead of the like period in 1953, and highway building will increase. Construction of schools, office buildings and commercial building will increase considerably. Residential building may increase 10 percent. A big year is forecast for 1954.

Robert J. Hummel, Consumers Co., Chicago, Ill., reminded that ready-mixed concrete is still new in Chicago (4 years) and continues on the increase. The greatest volume of ready-mixed concrete yet is expected for 1954. Home building and industrial building declines will be offset by increases in road building. The year 1954 will compare very favorably with 1953 and 1952. Mr. Hummel received no predictions to indicate a drop-off. He cautioned that the industry not be concerned at attempts to cut prices during temporary dull periods.

Herbert G. Jahncke, Jahncke Service, Inc., New Orleans, La., reported that construction proceeded at boom proportions in Louisiana and Mississippi through 1953. Heavy engineering contracts were up 47 percent in Mississippi and residential building was up 33 percent, for the greatest increase in any state east of the Mississippi river. The outlook for Louisiana, Mississippi and Oklahoma is excellent. Mr. Jahncke mentioned how this area is attracting more and more industries including three big new chemical plants, the Kaiser aluminum plant and that there are large grade separation programs, etc. The building of churches, schools and hospitals is at a record rate and all forms of housing construction are increasing. A new civic center is planned for New Orleans.

Business in the metropolitan area will increase in 1954 according to the report of Frank L. Kelly, Colonial Sand and Stone Co., Inc., New York, N.Y. The 1953 volume was 15 percent less than 1952 because of a 9-week strike in the summer, leaving a large backlog of construction. A great deal of private apartment houses and housing jobs being built for slum clearance will swell the total. Housing will increase about 10 percent in 1954 and the building of new schools will be at a high rate into 1955. Office building boomed in 1953 and will continue to do so. Sewage and road construction will increase. Industrial building is expected to increase by 10 percent in 1954. The New York Thruway is creating new business all around it.

Frank Penepacker, Readymix Concrete Co., Portland, Ore., said that 1953 volume equalled that for 1952 and predicted that 1954 would be a very good year. Price cutting is serious, he said, with 5-sack concrete selling for $9.75 per cu. yd. Payments are also becoming slower.

Louis C. Schilling, I. E. Schilling Co., Miami, Fla., reported that 1953 was a very good year with building permits far exceeding the 1952 total, and he predicted that 1954 would be another good year.

Severance Taxes

"An Examination of the Severance Tax Problem" was the subject of a paper by Harold M. Lacy, Gifford-Hill & Co., Inc., Dallas, Texas, presented before the concluding joint session of the two associations. Mr. Lacy's paper pointed to the danger of enactment of such taxes in the various states as the lawmakers search every possible source of revenue in order to meet mounting costs of government services.

Early in 1953, there were several bills proposed in Texas to enact a severance tax and producers were undergoing a periodic fight against its enactment. One of the bills called for a tax of 50 cents per cu. yd. on sand, gravel and crushed stone, which is fantastic, but 30 percent of the votes were in favor of the bill. As a result of this, the sand and gravel industry was circularized nationally for comment. Replies were received by the N.S.G.A. from 65 companies in 26 states, and comments were summarized by Mr. Lacy.

The survey disclosed that severance taxes on sand and gravel are being imposed only in Arkansas, Louisiana and West Virginia. The rate is ½ cent per ton in Arkansas, 3 cents in Louisiana and 8 mills in West Virginia.

Comments received disclosed that producers may be confronted with the problem in any state at any time. Typical of comments were the following:

From Maryland: "Maryland does not have a severance tax, but does tax sand and gravel land at a much higher rate than ordinary land."

From Minnesota: "We have a severance tax for iron ore, but as yet have none for any other minerals."

From Mississippi: "Several years ago, a sales tax was passed. Then a severance tax was placed on sand and gravel. Under the guise of double taxation, we finally managed to get both incorporated into one tax."

From Ohio: "We do not have a severance tax in Ohio. However, at each session of the Legislature, we are confronted with this problem."

From Oklahoma: "We do not have a severance tax, but there are a lot of 'blatherskites' in the legislature, now in session, who are trying to get through such a tax, and it is set at 1¢ per ton."

From Pennsylvania: "We presently have no severance tax on such materials as sand, gravel, and stone. In 1951, the legislature had such a bill introduced, but it was defeated."

From Tennessee: "The State of Tennessee does not have a severance tax. However, an attempt was made during the 1951 Session to pass such a tax, but it failed."

The industry was warned to be on guard, for once the tax is enacted there is no escape. Once the tax is enacted, Mr. Lacy said that the tax rate would be quite certain to be increased later, giving the tax in Louisiana as an example. That tax was started in 1910 at a rate of ½ of 1 percent of the value in the ground. This rate seemed low but later, was increased to 1½ cents per ton on gravel and one cent for sand. After World War II, with inflation, the rate was raised to 3 cents per ton on both sand and gravel, which, said Mr. Lacy, is an increase of 20,000 percent.

Ways to combat efforts to impose such taxes were suggested by Mr. Lacy. One strong argument applicable in every state is based on the widespread use of the industry's products by federal, state and local governments. While the proportion of such uses varies, the record in Texas has shown that the tonnage so used is very high. In 1953, it was found that 84 percent of commercial production was used by these classes of government. Considering production by government agencies, 10 percent or less of total

production in 1953 was used for private work. The argument set forth is that a severance tax would, in effect, be a tax upon a tax which means that the various branches of government would pay most of the tax. This would mean that the effect would be curtailment of the highway program and other public works by the extent of the tax. Should public work be exempted, then the revenue from severance tax would be insufficient to pay for collection and administrative expenses. Wayside production cannot be properly policed which would result in a discriminatory tax on commercial production. It was urged that these factors be brought to the attention of senators and representatives in state governments.

Should such tax be enacted in spite of these arguments then the industry, suggested Mr. Lacy, should seek to broaden the tax base and see to it that caliche, shell, lightweight aggregates, agricultural limestone, riprap, granite, clay, shale, lime, calcium chloride and other materials be included. It was also brought out that such tax should be based on dollar value rather than unit value.

Mr. Lacy said that state associations have tremendous value in cases like this, but he suggested that legislators prefer to hear directly from the industry itself. After the state association office has accumulated the information it would be best, he suggested, that several members of the industry present the information and arguments.

Left to right: Claude L. Clark, executive secretary, Ohio Sand and Gravel Association; Paul R. Smith, executive secretary, Empire State Sand, Gravel and Ready Mix Association; and H. Hershey Miller, resident engineer, Pennsylvania Sand and Gravel Producers Association

State Association Activities

FOUR LEADING STATE ASSOCIATION SECRETARIES discussed "Representation of the Industry at State Capitols" before the concluding joint session of the two associations.

Claude L. Clark, executive secretary, Ohio Sand and Gravel Association and Ohio Ready Mixed Concrete Association, Columbus, Ohio, outlined recent legislative actions of interest to the two industries and the association's activities in this respect. He discussed the recently imposed axle-mile tax at length. The association takes a very active interest in highway legislation and how the monies are spent. It keeps in close touch with respect to amendments proposed which may concern the industry. Mr. Clark told how the industry and the special effort of W. E. Hole, American Aggregates Corp., were instrumental in defeating a proposed law that would have permitted private insurance companies to invade the industrial insurance field. Such proposals are expected to be made again and bear watching.

Other bills being watched are perennial attempts to amend the strip-mine bill, which thusfar only applies to coal-stripping, and to enact severance taxes. The latter is expected to be proposed again in 1955. Another bill introduced would have permitted local subdivisions to become competitors in road materials. These developments are of the type that must be met by state groups since they apply only within a given state, said Mr. Clark.

H. Hershey Miller, resident engineer, Pennsylvania Sand and Gravel Producers' Association, Harrisburg, Penn., outlined his association's program covering the field of engineering, research and specifications as related to the industry. It is through these activities that sand and gravel and ready-mixed concrete have become accepted on a widening basis. Whereas, sand and gravel were unacceptable for some applications not too many years ago, they are now accepted in all types of construction equal to other aggregates. Ready-mixed concrete applications have also widened.

One of the goals was the policing of both industries with the end to improving quality to the satisfaction of the various classes of customers. Standards were set up for equipment and operation, and methods for quality control. The association has sponsored ready-mixed concrete courses and continues very active in specification matters. Problems of a technical nature now under consideration include the blending of crushed sand with natural sand, the utilization of fines from crushing gravel, methods for blending and classifying sand, heavy media treatment of gravel, and methods for defining or measuring angularity of gravel.

H. G. Feraud, executive secretary, Southern California Rock Products Association and Southern California Ready Mixed Concrete Association, Los Angeles, Calif., said that his office is represented before the interim committees which are set up for education in advance of the coming legislative meetings. Unemployment insurance and workmen's compensation bills are watched very closely as well as proposed ton-mile taxes to insure that any attempts will have equitable distribution. These associations cooperate with other industry organizations and benefit from their counsel, and are on the advisory committee on motor vehicle legislation.

Paul R. Smith, executive secretary, Empire State Sand, Gravel and Ready Mix Association, Buffalo, N.Y., organized in June, 1951, said that there are now 98 members and 39 associate members, making for a truly representative organization.

A system of sand and gravel and ready-mixed concrete committees are active within the organization. The association is very active in legislative matters, and holds a general meeting each January. Recently, it was effective in killing a requirement that piping be installed to vent exhaust gases away from the working area in the case of ready-mixed concrete trucks. The contractors, instead, must provide these facilities.

In the Long Island area, the association was effective in having a law, that would require covering of pits

Part of the Harry T. Campbell & Sons delegation. Left to right: Albert S. Cummins, Richard Campbell, and H. Guy Campbell

Annual luncheon, Manufacturers' Division, N.S.G.A.

or fencing them, changed so that local laws would regulate. The words "sand and gravel" were deleted from the law. At the present time, a bill has been proposed that would make conditions that attract children a misdemeanor and which would require 6-ft. fences topped with barbed wire around excavations. This bill has been opposed and likely will not pass.

Manufacturers' Division

MANUFACTURERS DIVISION of the N.S.G.A. held its annual luncheon business meeting on February 18. V. P. Ahearn, executive secretary of the N.S.G.A. addressed the group, commenting particularly on the exposition and the handling of future exhibits. Mr. Ahearn expressed his appreciation for the cooperation this past year of the Manufacturers Division and the Truck Mixer Manufacturers Bureau. He paid special tribute to Dwight Guilfoil, one of the founders of the division who died during this past year.

The Division passed a resolution to send a suitable letter of sympathy to the family of Mr. Guilfoil, and drew up a second resolution expressing thanks to all concerned for planning a fine exposition and convention.

R. P. McKenrick, Blaw-Knox Co., Pittsburgh, Penn., was elected chairman to succeed E. M. Heuston. Elected vice-chairmen were D. McM. Blackburn, Hendrick Manufacturing Co., Carbondale, Penn.; C. B. Laird, Eagle Iron Works, Des Moines, Iowa; J. C. McLanahan, McLanahan & Stone Co., Hollidaysburg, Penn.; and W. A. Rundquist, Pioneer Engineering Works, Minneapolis, Minn.

Elected to the board of directors were J. B. Bond, Nordberg Manufacturing Co., Milwaukee, Wis.; Emil Deister, Jr., Deister Machine Co., Fort Wayne, Ind.; John E. Dunn, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.; W. Neil Richardson, The Universal Engineering Corp., Cedar Rapids, Iowa; E. D. Stearns, Barber-Greene Co., Aurora, Ill.; Austin K. Thomas, Chain Belt Co., Milwaukee, Wis.; Roy Wills, Baldwin-Lima-Hamilton Corp., Lima, Ohio; and R. W. Hernlund, Western Machinery Co., San Francisco, Calif.

Emory M. Heuston, Bucyrus-Erie Co., past chairman of the Manufacturers' Division, N.S.G.A., left, and R. P. McKenrick, Blaw-Knox Co., newly elected chairman

Newly elected officers and directors of the Manufacturers' Division, N.S.G.A.

Moves Office

LYLE J. WALKER SAND AND GRAVEL CO. has announced the removal of its offices from Oak Park, Mich., to 4780 South Hill Road, New Hudson, Mich.

Sells Plant

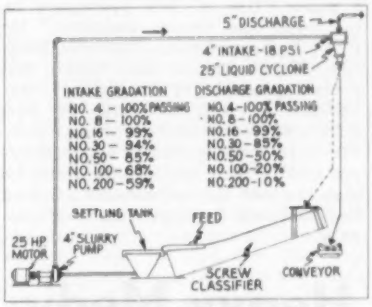
KEIL STONE & GRAVEL CORP., recently announced the sale of its plant and equipment to Catskill Mt. Stone Co., White Plaines, N.Y.

Operating Problems

RETENTION OF FINES in sand was the first subject covered in the round table discussions of operating problems led by M. C. Evans, vice-president, Becker County Sand & Gravel Co., Cheraw, N. C. His company operates five sand and gravel plants in North and South Carolina. Gravels in the Carolinas, said Mr. Evans, were of the clay-gravel type, and the problem has been how to retain the minus 50 and 100 mesh sand and discard the minus 200 sand which is mostly clay. It takes 1000 g.p.m. of water for each 100 t.p.h. of raw product fed into the plant to have the pulp thinned down so that the clay and sand would separate. This meant, he said, that 5000 g.p.m. would be needed for 500 t.p.h. of raw feed product. His company normally uses screw-type de-watering units, but the volume of pulp is so large that excessive turbulence in the screws causes a loss of the minus 50 and minus 100 mesh sand. Scalping tanks ahead of the screws did not work too well as the clay in the pulp gave such buoyancy that the fines were lifted out of the tank. One correction was to add more water, and this in turn would require a larger tank.

The company turned to the use of the 25-in. diameter Cottrell Whirlcones or "liquid cyclones," 14 of these units being operated in four plants. This size was standardized to simplify stocking of repair parts. By means of slides, Mr. Evans showed how they were installed, and the flow diagram gives the essentials of a typical installation. The sand and water flows from rotary screens and vibrators to 36-in. x 25-ft. Eagle dewatering screws. Overflow from the screws goes into a settling tank that is 30 ft. long, 8 ft. wide, and 5 ft. deep. A group of 4-in. Georgia Iron Works slurry pumps at the base of the tank have their suction in the bottom of the tank. A tank of this size is used for each 4000 g.p.m. of pulp with three 4-in. slurry pumps at 800 g.p.m. each to pick up the fines. Enough water is added to the tank so that it overflows a little all the time. Operated in this manner the pumps do not lose their prime. The overflow perimeter is 76 ft. The down-pull of the pumps is a factor in the retention of the fines, the speaker pointed out. The pumps deliver to the Whirlcones that operate in parallel. The pulp enters the Whirlcone tangentially and, due to the centrifugal action within the Whirlcone, size separations are accomplished. The recovered sands discharge at the base of the cone and the fines and excess water at the top. The cones operate under pressure. He called attention to the fact that more than 50 percent of the material going to the Whirlcones was minus 200 mesh and yet only 10 percent of the recovered fines passed the 200 mesh sieve.

In one slide, Mr. Evans showed six Whirlcones and six slurry pumps. This is a dredge operation using a 12-in. pump that delivers 7000 g.p.m. By the use of the liquid cyclones, it was possible to raise the minus 50 mesh from 9 to 18 percent and the percentage passing the 100 mesh from



Flow diagram of liquid cyclone circuit

1.8 to 4.5 percent. The pumps handle a slurry averaging 10 percent solids, and 7 t.p.h. sand is recovered in each Whirlcone. Mr. Evans showed a set-up where one 8-in. pump delivered in parallel to three Whirlcones.

In closing, the speaker said that it cost $3500 to buy and install a 4-in. slurry pump with a 30-hp. motor and the Whirlcone (includes switch and piping). Maintenance repairs and operating costs were 6 cents per ton on the fine sand recovered. This cost item does not include depreciation on the Whirlcones or pump.

The 12-in. pumping operation previously referred to was described in ROCK PRODUCTS, May, 1952, page 68. At that time four Whirlcones were in use and pulp was taken direct from the classifiers.

The second paper on the subject of retention of fines was presented by Robert H. Klossner, operations manager, Witte Gravel Co., Kinder, La. Mr. Klossner has had wide experience in the recovery of fines in sand that range from several plants in Texas to recovery of sand for Garrison dam in North Dakota. A.S.T.M. specifications for fines in sand require 10 to 30 percent minus 50 mesh, but Mr. Klossner said that when fines in sand are mentioned, he was referring to the minus 50 mesh size. Speaking of other Federal specifications, Mr. Klossner said:

"The Bureau of Reclamation and the U. S. Corps of Engineers usually require a minimum of 12 percent passing the 50 mesh; and 3½ percent passing the 100 mesh; however, on certain jobs these amounts are raised to a minimum of 12 percent passing the 50 mesh and retained on the 100 mesh; 3 percent passing the 100 mesh and retained on the 200 mesh and one percent passing the 200 mesh. I have produced sand for the U. S. Corps of Engineers, using the last set of specifications, and it was difficult not only because of the large amount of fines required but also because the specifications were written on a 'between screen' basis instead of the usual percent passing or percent retained."

The speaker said that where a deposit was deficient in fines it might be practical to haul in fines from another source and blend it with the current production, or to grind in a ball or rod mill excess sizes of material in the pit-run and blend this with the current sand. He described an installation at Garrison dam using a 20-ft. Wood bowl classifier. This installation was described in ROCK PRODUCTS, October 1953.

The deposit, he said was deficient in fines so an additional source of fines was necessary. These specifications were as follows: 12 to 22 percent, 50 to 100 mesh; 3 to 7 percent, 100 to 200 mesh; and 1 to 3 percent of 200 mesh.

The plant used about 2000 g.p.m. of water, the speaker said. The 20-ft. Wood Vortex classifier had a volume of water, above the sand bed, of 357 cu. ft., a depth of water at the perimeter of 9¼ in., and a depth of water at the center of 1 ft. 8 in. Mr. Klossner further described the unit saying the depth of the sand bed at the perimeter was 10⅜ in. Using a settling rate for 230 mesh sand of 0.580 f.p.m. they found that the 230 mesh grains would settle about 9½ in. at the edge, which was sufficient for the rakes to catch and return them to the discharge mechanism.

The discharge from the unit had the following analysis; 95 percent minus 50 mesh, 45 percent minus 100 mesh, and 20 percent minus 200 mesh. The rate was 20 to 25 t.p.h. at 27 percent moisture. This material was dumped into an over-speed double screw de-watering unit set at 14 deg. The overflow from the screw was pumped back to the bowl. Deficiencies in the feed were made up by blending a fine river sand at the feed end of the plant, plus, grinding in a rod mill the 30 to 50 mesh size to all minus 50 mesh.

Mr. Klossner described a Texas installation where a 10-in. pump delivered to two classifiers ahead of the Wood unit. The former removed an excess of the 16 to 50 mesh, and the remainder of the sand went to the bowl. The unit handled 150 t.p.h. with an overflow of ⅝ t.p.h. of desirable sand. The bowls had a feed of 4000 g.p.m. as a 6-in. clear water line went to the plant.

Manufactured Sand

"Production of Fines by Crushing and Grinding," was the subject covered by Robert S. Barneyback, vice-president, Henry J. Kaiser Co., Oakland, Calif., with the aid of slides, which showed the installation of three rod mills at the Radum, Calif., plant. He also showed micro-slides of the sand produced from the rod mills and natural sand from the Radum pit. It appeared that the rod mill sand was less angular than the natural. The speaker described the need for sand at Radum, and of the large accumulation of pea gravel on hand which was being fed to the mills. Two of the larger mills were working from this stockpile while a third smaller rod mill was in the plant taking a cut out of current production, grinding and returning it to the system. The rod mill installations at Radum have been described in ROCK PRODUCTS with the more recent data published in the January, 1953 issue. The rod mills are all Marcy units. One of the mills operated dry, but it was changed over to wet operation, and a 60-in. Wemco de-watering sand machine was used as a part of the installation. The rod mills, Mr. Barneyback said, had Lorain rolled steel liners with manganese steel ends having a 6-in. maximum thickness. As the feed end has the most liner wear, liners are switched as required. Tabulated data was given to those attending.

The tabulated data showed that the No. 1 rod mill had an average production rate of 50 t.p.h. of finished sand, average consumption of rods is 1.04 lb. per ton of finished sand, and average consumption of liners and lifters is 0.1 lb. per ton of finished sand. The product was classified by bowl and rake classifier. These data indicate that the rod mill product has some excess of minus 200 mesh material in it, and Mr. Barneyback pointed out that in their case a sand with over 4 percent minus 200 mesh would not drain properly.

C. A. Williamson, plant superintendent, Perkins Gravel Co., Sacramento, Calif., in describing the production of sand with a ball mill, said that such a unit would bring a harsh sand into line with a better particle shape than a crushed product and daily maintenance would be very low. The ball mill reduced a ¾-in. by ⅜-in. material, comprising quartz and volcanic rocks that were very hard and tough and had a sp. gr. of 2.77. The mill used was a "75" grate-type discharge Marcy (7 ft. dia. x 5 ft. long) that used a 120-hp. motor and had a 10 t.p.h. feed. The spiral scoop feeders were discarded, and a chute fed direct through the trunnion. This was possible as the ball load was reduced to 6 tons as compared to 11 tons recommended for most uses. Grinding media were 4½-in. dia. centrifugally-cast steel balls. Liners were the shiplap type.

Mr. Williamson said he expects to grind 150,000 tons with the liners now in the mill, based on a 30 percent scrappage. A new set weighs 26,000 lb., and on this basis liner wear would be 0.17 lb. per ton of feed which at 17 cents per pound for liners is 3 cents per ton. Ball wear is 1½ lb. per ton, with balls costing 6 cents per pound or 9 cents for balls. Power is 15 cents per ton, grease and lubrication and maintenance another 3 cents, making a total cost of 30 cents per ton.

Belt Conveyors

Some practical suggestions to prolong belt conveyor life were given, in a paper "Use of Belt Conveyors in the Sand and Gravel Industry," by R. V. Jackson, Robins Conveyor Division, Hewitt-Robins, Inc., before the operating session of the N.S.G.A. Mr. Jackson stressed the value of producers working closely with manufacturers in the selection of belt conveyors and in their maintenance, and he also stressed the advantages of good housekeeping in improving performance.

Heavy Media

EXPERIENCE WITH HEAVY MEDIA in the removal of deleterious materials from gravel after considerable experience was told by L. P. Struble, Dravo Corp., Pittsburgh, Penn. A year after his earlier report, he said that the plant continued to give acceptable performance. Early in 1953, a belt-type magnetic separator was installed to replace one of the cone-type. In the processing of 156,000 tons of gravel, 128,000 tons of media was used, or the loss of media was 0.82 lb. per ton of production.

During a period of 10 months, the plant was operated 1500 hr. at an average rate of 104 t.p.h., with a maximum of 150 t.p.h. The process has proven dependable. The plant has been winterized with suitable enclosures and heating to permit operation in sub-freezing weather. There has been some loss in small particles which it is hoped to minimize.

Operating cost has been 12 cents per ton, excluding depreciation, of which the major item is 4 cents per ton for screen maintenance. It is expected to cut that figure to 2 cents.

The cost of 12 cents per ton does not tell the entire story, said Mr. Struble, because it is now possible to excavate right through material heavy with clay, coal and wood. Formerly, practice was to avoid such materials as much as possible by moving to other locations. While these delays do not show up on the cost sheets, Mr. Struble believes their elimination offsets much of the 12 cents per ton figure.

Following the talk on the use of heavy media for the removal of deleterious particles from gravel by L. P. Struble, Dravo Corp., Pittsburgh, Penn., R. W. Hernlund, Western Machinery Co., San Francisco, Calif., presented a paper, "Considerations in Applying Heavy Media Separation to Beneficiation." As related to heavy media, deleterious materials where defined as those minerals and rocks which cause aggregates to be unacceptable and which can be separated from the sound constituents of the aggregates by respective differences in specific gravities.

Mr. Hernlund referred to four separate heavy media plants, to bring out reasons why the process might be considered for use. Each installation was discussed briefly. The Royal Canadian Air Force was the first to apply heavy media to the beneficiation of gravel. Its plant started operation in 1948 with a capacity for 30 cu. yd. per hr. of acceptable 2½-in. x 10-mesh aggregate. There were several factors in the decision to use heavy media separation. The nearest deposit of acceptable gravel was 165 miles distant and freight cost to destination was $2.50 per ton. Local gravel deposits were found to be acceptable after removal of deleterious materials which consisted of a lightweight shale fraction. Removal of 5 to 10 percent of undesired material left a heavyweight fraction which met all specifications. Local gravel could be supplied at $1.70 per cu. yd. including the cost of heavy media treatment as compared to $4.30 for gravel shipped in from the nearest commercial source.

The Dravo Corp., Pittsburgh, Penn., with a 200 t.p.h. plant processing Ohio river gravel, was the first commerical sand and gravel producer to apply the process, in May, 1952. Mechanical methods for the removal of soft and porous gravel, coal and wood had been tried but with only partial success and at high cost. The heavy media process was adopted after exhaustive test investigations to determine the amenability of the gravel to this treatment.

Owatonna Aggregates Corp., Owatonna, Minn., was the next producer to treat gravel by heavy media. The gravel in the area, when used for concrete, contributed to rapid surface disintegration with the result that concrete aggregates had to be shipped in from outside areas. Heavy liquid tests demonstrated that lightweight fractions containing shale, soft limestones and iron oxides could be separated as unsound material from a heavier acceptable aggregate. Another consideration was that the "rejects" could be marketed for non-concrete purposes. This plant was described in ROCK PRODUCTS, July, 1953.

A fourth plant was recently installed in Michigan to remove soft sandstone and chert in the production of a premium quality product. Successful operation of this plant stands to place the producer in an enviable marketing position. The separation between the chert and the sound aggregate in this case is a very close case based on specific gravities.

Theory and Practice of

LIME MANUFACTURE

By VICTOR J. AZBE*

Part VIII. Simplified procedure of kiln performance evaluation by means of exhaust gas analysis

SINCE CARBON DIOXIDE is released in the process of calcination of limestone, it is possible to evaluate and study the performance of either vertical or rotary lime kilns, cement kilns and rock wool cupolas better than any other sort of combustion apparatus. Unfortunately this is seldom taken advantage of. It is possible that the required procedure seems involved. It can be involved, but there is also a simple approach which we propose to outline here.

The method requires the use of a gas analyzer which should be of convenient type, such as a Hays three-chamber Orsat or one of the more portable bubbling pipette type units of adequate range of burette calibration. The faster the machine and the operator the better, because by this method it is possible to study kiln efficiency not only over a prolonged period of time, but to detect sudden variations as well, which are also important in that they affect the overall performance.

Combustion of a carbon containing fuel will produce CO_2. Coke produces more than natural gas because it contains more carbon in its combustible portion. Natural gas has less because a substantial amount of it is hydrogen. The amount of carbon there is in a fuel is fairly well known and it does not vary much by groups of fuels, thus permitting construction of generalized charts.

Coal gives less CO_2 than coke, but most coals, excepting lignites or others of sub-bituminous class will fall into a close group. Most of the types of natural gas used also fall into a group and as for fuel oil, commercial fuel is usually the high carbon bunker C.

For an equal amount of heat developed, wood will give about the same amount of CO_2 as coke. This appears strange but is readily explained by the fact that the combustible of the coke is low in hydrogen, while the combustible of the wood is low in available hydrogen ($H-\frac{O_2}{8}$), thus virtually equalizing the two as far as gas analysis is concerned.

Fuel may be burned with more or less excess air resulting in a higher or lower apparent CO_2 content, which is revealed by the oxygen content. Fuel may also be burned incompletely, producing a reduced amount of CO_2, but that is revealed by the presence of CO. By calculations, these conditions can be allowed for and incorporated into graphical charts.

Thus the analysis of the products of combustion will portray a certain definite relationship between the presence of CO_2, O_2, and CO. For any specific percentage of O_2 or CO there will be a definite percentage of CO_2.

In case of boilers and other furnaces in which carbonate containing matter is not calcined, results of gas analysis show the amount of excess air or of incomplete combustion. In case of the lime kiln this is also shown and, in addition through suitable interpretations, the specific kiln efficiency of the moment and of the section from which the gas sample is obtained.

Any excess of CO_2 above the normal for the fuel comes from either the dissociating $CaCO_3$ or $MgCO_3$ in a very definite amount. Thus, if the kiln makes either more or less lime per unit weight of fuel fired that is bound to be immediately revealed by the variation of CO_2 in the kiln exhaust. It is unalterable, that for any lime made at the moment a definite amount of CO_2 will escape, increasing the normal CO_2 content of the products of combustion.

If the coal is wet, it does not matter as far as analysis is concerned because the escaping water condenses when the gases are analyzed. If the coal is high in ash it also does not matter. If there is leakage or excess air indicated by oxygen, or incomplete combustion indicated by carbon monoxide, it does matter greatly, but this can be allowed for in the calculations and "Equivalent CO_2" obtained.

Chart Saves Calculation

The calculations are somewhat complex. For most accurate results one must take the ultimate analysis of each respective fuel in consideration as well as test the gases for presence of other combustibles besides the CO. For those interested in this more complete approach it is suggested that they study the details of the article on this subject presented by Warren H. Weisz of the Azbe Corporation in ROCK PRODUCTS, March, 1952. This article with its chart, is prepared merely to point toward a simple, readily adaptable procedure which in a practical sense is satisfactory. This is done in the hope that the method would be more commonly employed since it is interesting and rapidly reveals the relative state of kiln efficiency without calculations which are usually a deterrent to the use of a method.

The chart is designed for use with high calcium lime of low magnesia content, and by use of the separate curves is applicable to coke, wood, a fair grade of coal, a high methane natural gas or bunker C fuel oil.

It is desirable to take frequent samples over a prolonged period and to analyze them quickly. It never should require more than 10 min. to complete the analysis for all three gases and the aim should be to do it in 5 min. It can be done in 5 min. if the instrument is suitable and the solutions are good. Care must be taken that the instrument is in good order, that its petcocks do not leak, and that the respective gases are completely absorbed by check.

The study by means of gas analysis may involve separate sections of a kiln or the entire kiln. If of separate sections, a gas sample must somehow be obtained from each section. If the study is of the entire kiln, the sample should be from the common exhaust stream; as, for example, from the discharge of the exhaust fan.

How to Use Chart

The illustrated chart,** which should be large, presents one simple example for its use by means of dotted lines. It is assumed that the kiln gas has been analyzed and that it contains 30.1 percent CO_2, 2.5 percent O_2, and no CO. However, that CO_2 which the anaylsis reveals is only the apparent CO_2, as the gases are diluted with air which may have come through the kiln as excess air, or through the stone charging end as leakage air.

But we are not interested in the "Apparent" but rather in the actual

*President, Azbe Corp., St. Louis, Mo.

**Chart may be obtained from Azbe Corp.

or "Equivalent CO_2" as the higher this figure is for any given fuel, the higher is the thermal kiln efficiency.

Referring to the chart, starting with oxygen content as *"A"* 2.5 percent, we follow horizontally to meet the apparent CO_2 line coming vertically from *"B"* 30.1 percent at junction point *"C."* From this we travel diagonally downward parallel to the guide lines to *"D"* where the equivalent CO_2 is revealed as being 34.2 percent.

This equivalent CO_2 is a critical figure, but it has a somewhat different meaning for different fuels. For coke, which is virtually all carbon, it is one thing. For natural gas, which is very high in hydrogen, it is another. The chart therefore features a series of "Fuel Lines" for coke, wood, coal, fuel oil or natural gas.

In the case of the example given, fuel was coal. Therefore from the "Equivalent CO_2" at *"D"* we follow vertically to the coal curve at *"E."* On the level with this at *"F,"* we obtain the answer which is that 5.9 million B.t.u. were required per ton of oxides produced.

If lime of 95 percent lime oxide quality was being produced, a correction can be incorporated by running from *"F"* to 95 percent line at *"G,"* giving the answer 5.6 million B.t.u. per ton of lime produced at *"H."*

The example was a simple one. If the gases had contained carbon monoxide also, then at *"B,"* half of the CO content would have had to be added to the CO_2 content. That is, if CO had been 2 percent, the CO_2 point *"B"* would have been shifted over one percent from 30.1 to 31.1. Otherwise the procedure would have been the same. This adding of half the CO present to the CO_2 constitutes the simple approach which, while entirely satisfactory for practical use, is at some points not entirely correct.

However, if absolute accuracy was desired, it would have entailed the elaborate procedure of complete gas analysis for all likely present combustible gases and calculation by the complex equation on the chart.

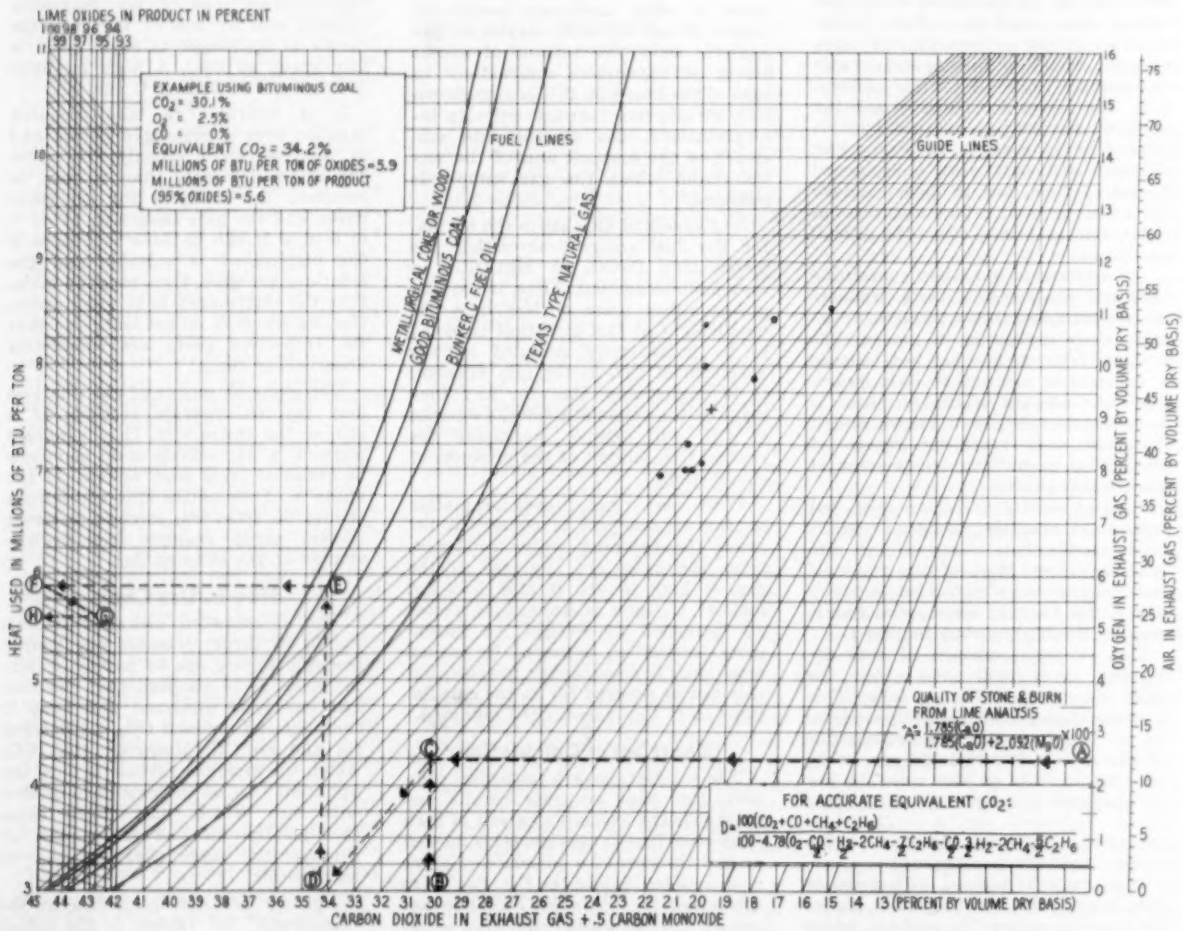
The advantage of the method outlined is that results of any operating action may be obtained immediately. Variations of fuel feed, in change of draft, change in period of lime draw, etc., are reflected for better or worse in the "Equivalent CO_2."

Effect of normal changes can be observed and their effect evaluated. Changes may also be deliberately made to learn of their effect on thermal efficiency. In the matter of mere hours considerable information can be collected.

In case of a rotary kiln where conditions are more constant, one man is needed to do the testing. In case of vertical kilns, one man alone can do it, but two are better. One of these would do the gas analyzing, making a complete analysis of all three gases at least once every 10 min. The other would be observing and recording data, such as kiln draft and draft drop, producer pressure and pressure drop, temperature of producer gas and of exhaust gas, the precise time of firing, of lime drawing and all other possible obtainable operational data, all being correlated with respect to time of gas sampling; that is, all of the data collected as close as possible before the taking of the sample.

After completion of the test all data obtained, together with operating remarks, should be tabulated by numbered columns, and the analysis respecting each column be plotted on the chart by the respective numbers as shown and then evaluated.

(Continued on page 122)


LIME OXIDES IN PRODUCT IN PERCENT
100 98 96 94
99 97 95 93
EXAMPLE USING BITUMINOUS COAL
CO_2 = 30.1%
O_2 = 2.5%
CO = 0%
EQUIVALENT CO_2 = 34.2%
MILLIONS OF BTU PER TON OF OXIDES = 5.9
MILLIONS OF BTU PER TON OF PRODUCT (95% OXIDES) = 5.6
FUEL LINES
GUIDE LINES
METALLURGICAL COKE OR WOOD
GOOD BITUMINOUS COAL
BUNKER C FUEL OIL
TEXAS TYPE NATURAL GAS
HEAT USED IN MILLIONS OF BTU PER TON
OXYGEN IN EXHAUST GAS (PERCENT BY VOLUME DRY BASIS)
AIR IN EXHAUST GAS (PERCENT BY VOLUME DRY BASIS)
CARBON DIOXIDE IN EXHAUST GAS + .5 CARBON MONOXIDE (PERCENT BY VOLUME DRY BASIS)
QUALITY OF STONE & BURN FROM LIME ANALYSIS
$\%A = \frac{1.785(CaO)}{1.785(CaO)+2.092(MgO)} \times 100$
FOR ACCURATE EQUIVALENT CO_2:
$D = \frac{100(CO_2+CO+CH_4+C_2H_6)}{100-4.78(O_2-\frac{CO}{2}-\frac{H_2}{2}-2CH_4-\frac{7}{2}C_2H_6-\frac{CO}{2}\frac{3}{2}H_2-2CH_4-\frac{5}{2}C_2H_6}$

Kiln thermal efficiency chart. (High calcium lime kiln, "A" equals 97 for primary fuels)

Board of Directors of the Pennsylvania Stone Producers Association: seated, left to right, Nick Cascetti, Stowe Trap Rock Co.; Clarence Wiest, D. M. Stoltzfus & Son; John D. Teeter, John S. Teeter & Son, Inc.; Leonard S. Fry, Fry Coal & Stone Co.; Lewis M. Nauss, The Carbon Limestone Co.; John Rice, Jr., General Crushed Ctone Co.; standing, left to right, J. C. Showalter, Blue Ball; Tom McPoyle, The John T. Dyer Quarry Co.; F. I. Narehood, Narehood Bros.; H. H. Wagner, general manager of the association; Paul I. Detwiler, New Enterprise Stone & Lime Co.; H. Melvin Binkley, Binkley Bros.; and Robert B. Garman, Tyrone Lime & Stone Co., president

W. S. Giles, president, Pennsylvania Sand & Gravel Association, Iron City Sand & Gravel Co.; J. M. Zolek, Warner Co.; H. Hersey Miller, executive secretary of the Pennsylvania Sand & Gravel Association

Pennsylvania Producers Hold Joint Meetings

TWO IMPORTANT MEETINGS were held at the Penn-Harris, Harrisburg, Penn., by the producers of aggregates in Pennsylvania; the Pennsylvania Stone Producers Association on January 28, and the Pennsylvania Highway Material Producers Conference on January 29. The Conference was organized in 1953 by the stone, sand and gravel and slag associations. The Bituminous Concrete Association was invited to join the group for the annual meetings.

President Paul I. Detwiler of the Pennsylvania Stone Producers Association gave a resume of conditions in the stone industry in his opening address in which he noted that the small crushed stone operations, with relatively low production, were gradually disappearing, and they were being replaced by highly mechanized large plants with high hourly production. Treasurer H. M. Binkley gave his report which was approved.

General manager of the association, H. H. Wagner, reported that the Pennsylvania Department of Highways had purchased a slightly larger tonnage in 1953 than in 1952. The tonnage figures for 1953 were: stone, 1,878,288; gravel, 362,274; slag, 370,515. Comparable figures for 1952 were: stone, 1,862,925; gravel, 290,229; slag, 465,556. Average selling prices per ton in 1953 were: stone, $2.41; gravel, $2.44; and slag, $2.72. Average selling prices in 1952 per ton were: stone, $2.49; gravel, $2.27; and slag, $2.60. In 1953, the department purchased 319,243 tons of premixed bituminous materials costing $2,124,840.

Considerable discussion developed over truck legislation, damage suits from blasting, and the matter of legislation which would require that contractors bidding on highway construction file the sources of material supply with their quotations. President Detwiler appointed F. I. Narehood, Leonard S. Fry, Thomas P. Rogers and T. C. McPoyle to consider truck legislation which would be necessary to give relief to the crushed stone and ready-mixed concrete industries. To consider the problem of damage suits from quarry blasting, he appointed a committee comprising Oscar Benson, Paul White, Thomas Rogers and Geo. DiFrancesco to develop plans so that each quarry operator would have the necessary records and scientific data to combat future blasting damage suits as well as information which would be helpful when the state legislature formulates laws covering the use of explosives. In the matter of legislation requiring contractors to file source of material supply with their quotation, it was voted to table consideration until a rough draft of the proposed legislation could be submitted to the board of directors or executive committee.

The following officers and directors were elected: president, R. B. Garman, Tyrone Lime & Stone Co.; vice-president, John D. Teeter, John S. Teeter & Sons; treasurer, H. M. Binkley, Binkley Bros. Inc.; secretary, W. H. Fehr, Berks Products Corp.; for directors, W. E. Wilson, Hoffman Bros. & Wilson; J. C. Showalter, Showalter Quarry; Paul E. White, Valley Quarries; F. I. Narehood, Narehood Bros.; Lewis M. Nauss, The Carbon Limestone Co.; and Adam Eidemiller, Eidemiller Enterprises, Inc.

The meeting was adjourned to a cocktail party and banquet at which William Eathorne, U. S. Bureau of Mines, gave a practical demonstration of the hazards of static electricity to industry.

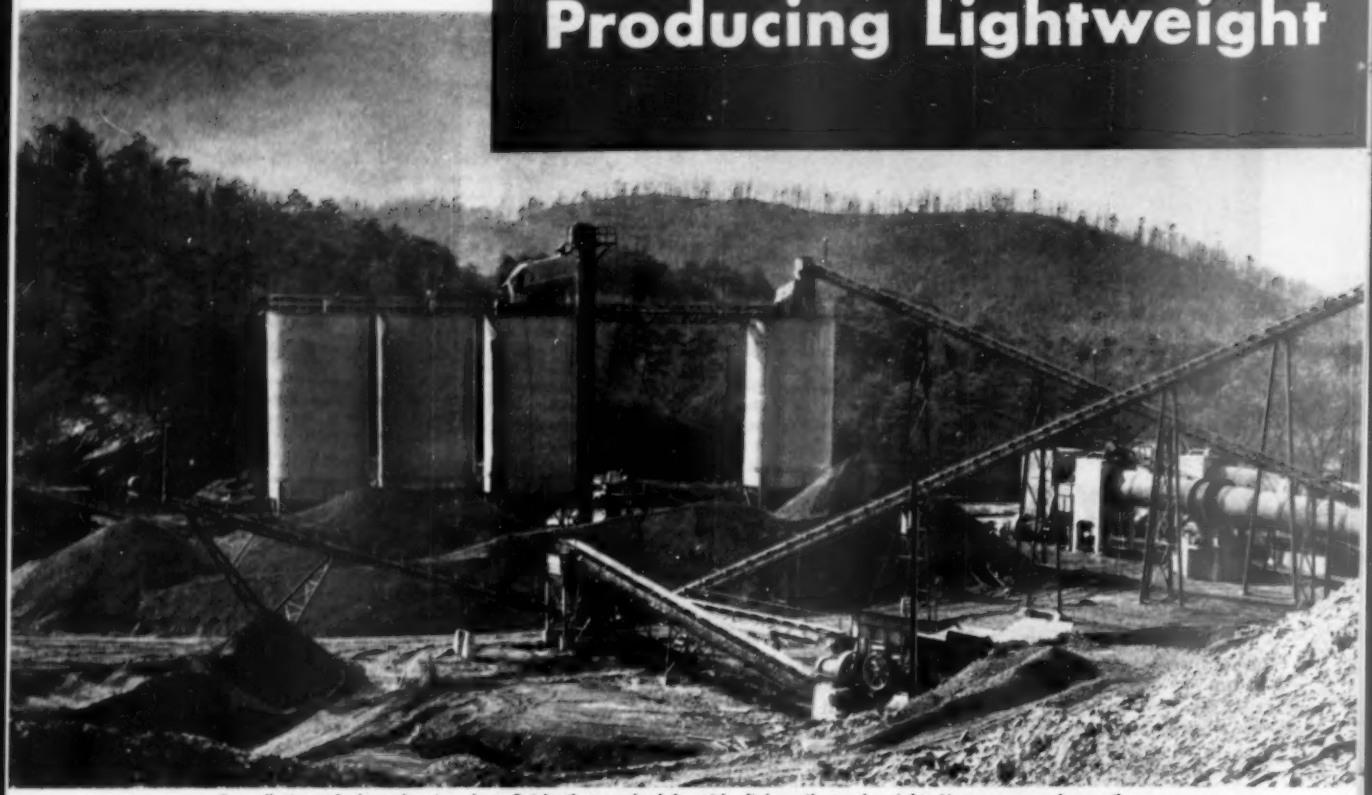
Highway Material Producers Conference

Robert B. Garman, president of the Pennsylvania Stone Producers Association, presided at the Pennsylvania Highway Material Producers Conference on January 29. Over 200 members and guests attended this meeting which represented the Pennsylvania Sand & Gravel Association, the Pennsylvania Slag Asosciation, the Pennsylvania Stone Producers Association and the Bituminous Concrete Association of Pennsylvania.

(Continued on page 132)

Slag producers attending meeting: R. K. Plumb, U. S. Steel Corp.; Fred Hubbard, Pennsylvania Slag Association; J. H. Turner, Cambria Slag Co.; A. L. Seaman, Duquesne Slag Co.; A. J. Donoughe, K. L. Dunbar Slag Co.; Ray E. Britton, executive secretary, Pennsylvania Slag Association; and C. D. Myers, Duquesne Slag Co.

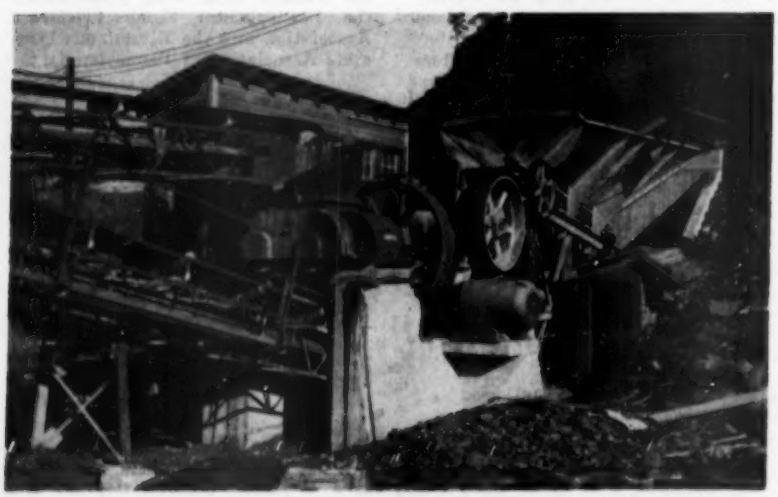
Producing Lightweight



Overall view of plant showing three finish silos, to the left, with clinker silo to the right. Note screens above silos

ONE OF THE LATEST, modern artificial lightweight aggregate plants to go into production is the Georgia Lightweight Aggregate Co. operation at Rockmart, Ga. The product is being sold under the trade-name of "Galite."

High efficiency and economy in the handling of raw and finished materials with mechanization throughout so that continuous low cost production can be maintained are emphasized in the new plant which was designed by Otto C. Frei, at the time with the Smithwick Concrete Products Co., Portland, Ore. After the construction phases of the plant were well advanced, Mr. Frei assumed the presidency of the Georgia Lightweight Aggregate Co. This is the fifth artificial lightweight aggregate plant that Mr. Frei has designed, and in it he has crystallized his thinking with the desire to attain the ultimate in high productivity, low operating cost, and a consistently high quality product.



Raw material crushing set-up. To the right is the apron feeder supplying the jaw crusher, and to the left is the double-roll crusher

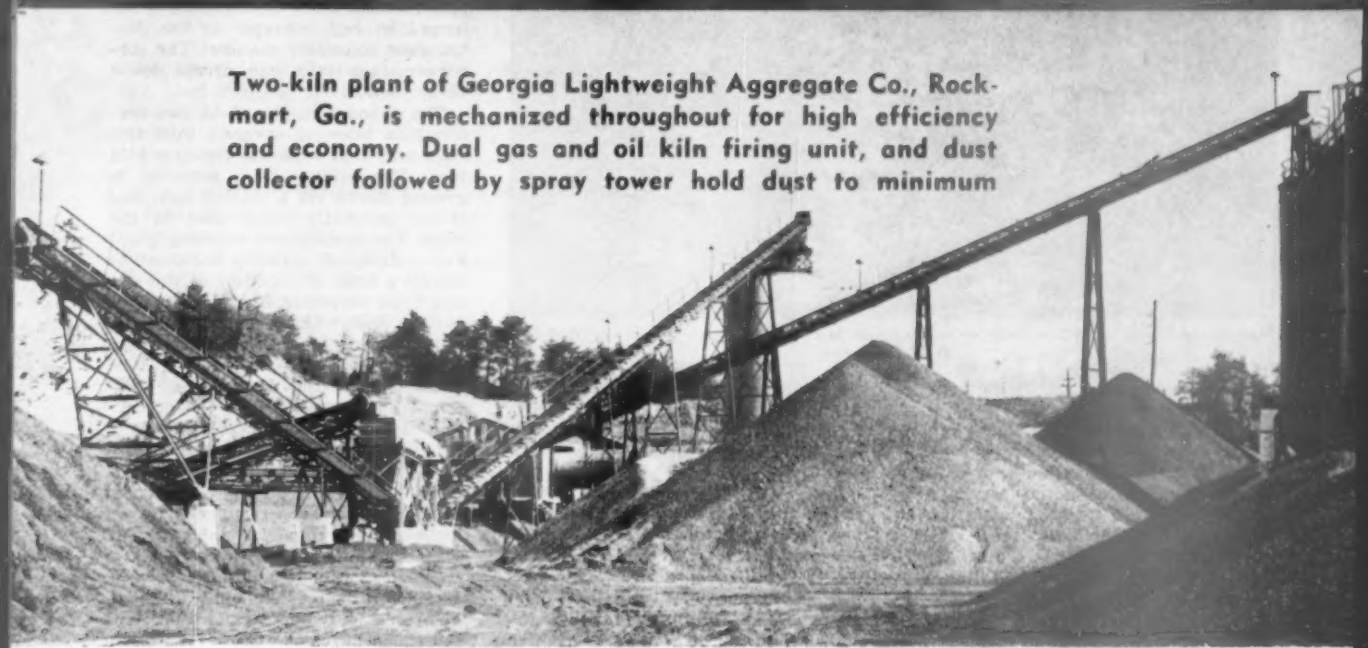
Favorable Experiences

Expanded shale aggregate has demonstrated its stability and usefulness as a lightweight, sound-proof and enduring concrete structural material. One outstanding example is the "Selma" a lightweight concrete boat constructed during World War I by the Fred T. Ley Co., Mobile, Ala., using expanded shale as the main aggregate. It was sunk in the Galveston, Texas harbor about 34 years ago and recent examinations showed it to have concrete in the 9000 p.s.i. (compression) range. Steel reinforcing rods that were buried only ¾-in. are still free from sea-water pitting. Other outstanding uses for expanded shale was in the new Statler Hotel in Los Angeles, the Tacoma Narrows bridge in the Northwest where savings in structural steel alone amounted to almost 750,000 lb. and, with a similar weight saving in steel cables, all added up to a dollar saving of about $320,000. Expanded shale aggregate combines strength, insulation, vermin-free, and low sound absorption qualities all in one package.

The new plant of the Georgia Lightweight Aggregate Co. is the most southeasterly of any in the United States. The nearest plants to the north are in west Tennessee, northern Kentucky, and the western section of North Carolina. To the West, the nearest plant is on the Mississippi river in Louisiana.

Aggregate from SLATE

by WALTER B. LENHART



Two-kiln plant of Georgia Lightweight Aggregate Co., Rockmart, Ga., is mechanized throughout for high efficiency and economy. Dual gas and oil kiln firing unit, and dust collector followed by spray tower hold dust to minimum

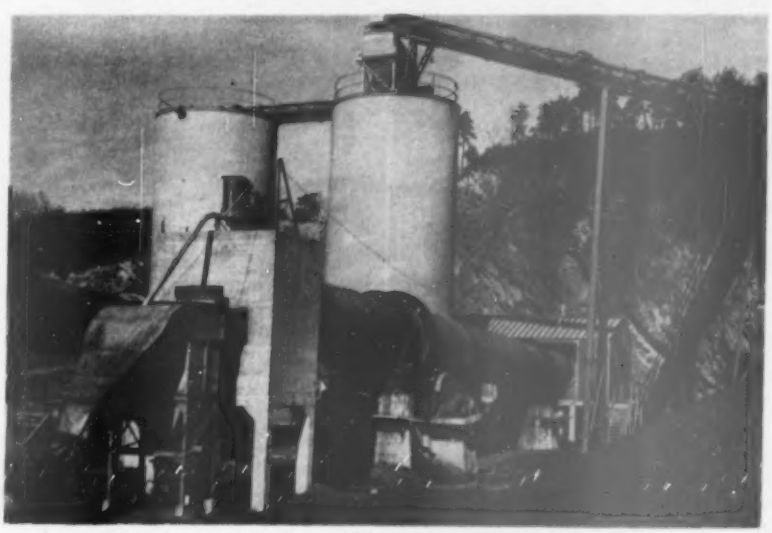
Throughs from vibrating scalper screen, in center, move up long conveyor to screen over raw material silos, to the right

Rockmart, where the new plant is located, is 54 miles northwest of Atlanta, Ga., on the rails of the Seaboard railroad with direct switching connections to the Southern railroad. Rockmart is from a Welsh term meaning "Rock Market" for the city was once the scene of a thriving roofing slate business, an important industry for Georgia. Georgia slate production terminated some 25 years ago, and the economic use of this material was considered lost forever. All that remained was the immense openings that the early Welsh miners had made in their quest for slate for building and industrial uses.

During World War II, Mayor William B. Hartsfield of Atlanta sparkplugged a drive that led to investigations by the Georgia Department of Mines & Geology, under the direction of Captain Garland Payton and Dr. A. S. Furcron, and the Tuscaloosa station of the United States Bureau of Mines. Additional investigations of the Rockmart slates were made by T.V.A. at Norris, Tenn., as well as several private laboratories. These comprehensive investigations led to the conclusion that the raw material at Rockmart was ideal for the production of a stable, high-quality artificial lightweight aggregate. After the formation of the Georgia Lightweight Aggregate Co., further semi-commercial testing of the Rockmart slates was conducted, and during November of 1952 plant construction was started. The plant started operation in September, 1953.

Drilling and Excavation

Rockmart slate is gray colored with material nearer the surface tending to oxidize to a yellow color. The oxidized material can be used for manufacturing the lightweight aggregate, but the finished products resulting from its use have a different color than that produced from the gray slate. As a uniform product is desired, the oxidized material is being stripped off and wasted. At the pit opened up for preliminary operations, the amount of overburden varies from a few feet up to 10 or more. Stripping operations are now underway to eventually expose a long horizontal bench of gray slate that can be drilled vertically and in a systematic manner. The material drills relatively easy, and quarry fragmen-



One of two 8- x 125-ft. rotary kilns with dust collector in foreground

Left to right: Lane W. Wilcox, sales manager; Gilmer MacDougald, secretary-treasurer; and Otto C. Frei, president

tation is not a problem. Drilling from a single bench about 25 ft. high is done with a Joy (Sullivan) wagon drill with air supplied from a portable Chicago Pneumatic compressor. Two Euclid rear dump trucks are loaded with a 2-cu. yd. Lorain diesel driven shovel. The haul from the face, opened up above the plant, to the primary crusher is about 900 ft. and downgrade in favor of the loads.

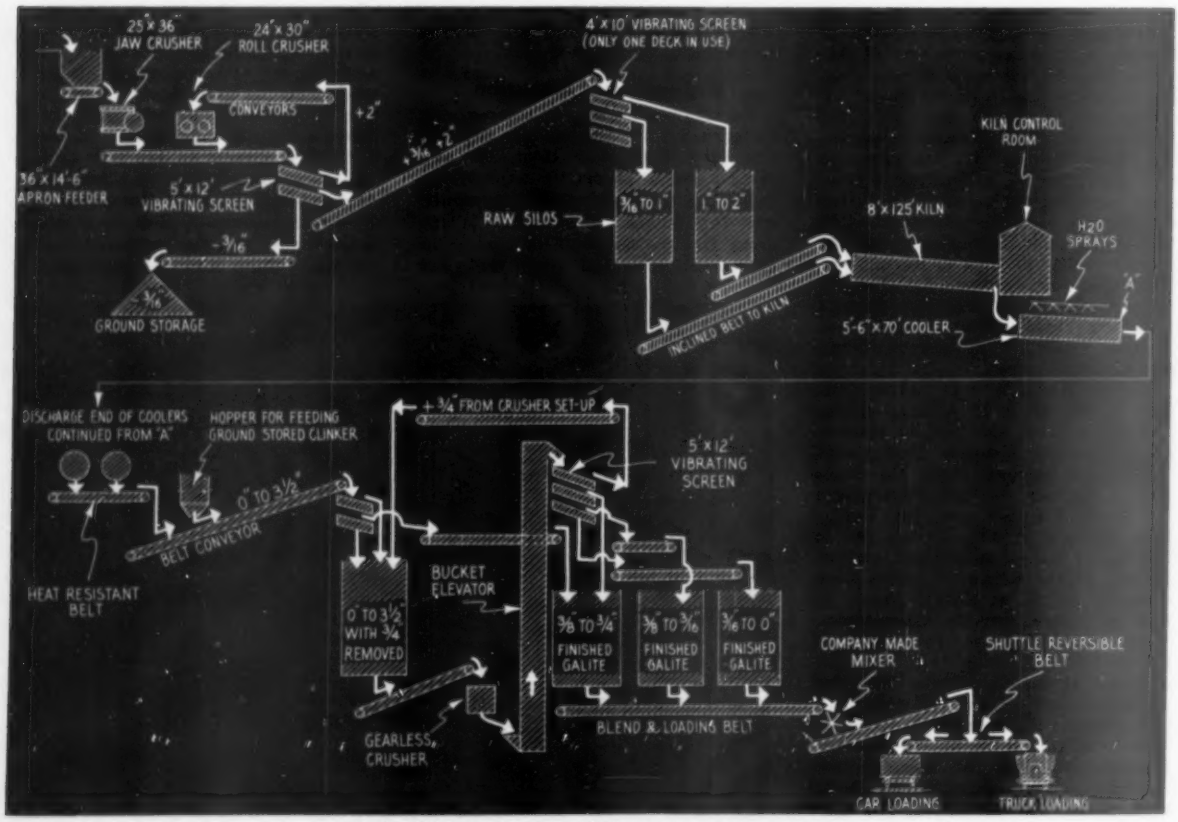
Belt conveyors are used throughout, with one exception, for handling raw and finished materials, with belt widths ranging from 18 in. to 30 in. All the conveyors are Barber-Greene units. Electrical controls and motors are all General Electric.

Crushing and Screening

The initial raw processing unit is built around the use of a 25- x 36-in. Telsmith jaw crusher and a 24- x 30-in. McLanahan & Stone Co. double-roll secondary crusher with a 5- x 12-ft. Seco double-deck vibrating screen between. The jaw crusher is fed by a 36-in. x 14-ft. 6-in. heavy-duty Telsmith apron feeder. The minus 5-in. crushed slate from the jaw crusher is moved by belt conveyor to the Seco scalper screen, and the plus fraction from the top deck is returned by belt conveyor to the McLanahan secondary crusher. The corrugated-face rolls are driven by a 75-hp. motor.

The minus 2-in. plus $\frac{3}{16}$-in. raw material is later re-screened into two sizes and kept separate for raw kiln feed. The minus $\frac{3}{16}$-in. material is ground stored via a stacker belt, and is not currently being used in the kilns. The preliminary crushing plant has a designed capacity sufficient to handle a total of six kilns of the size and type currently in use. The fines (minus $\frac{3}{16}$-in.) find a considerable sale locally as a road base stabilizing material as it seems to have natural bonding properties. Later, when additional kilns are added to the production line, the minus $\frac{3}{16}$-in. material will be burned separately in its own kiln.

The minus 2-in. plus $\frac{3}{16}$-in. material from the scalper screen goes up an inclined belt conveyor to a second Seco screen mounted over the two kiln feed silos. This is a totally-enclosed, 4- x 10-ft. three-deck unit although at present only one deck is used. This screen prepares the two sizes of kiln feed, previously mentioned, with the



Flowsheet of raw processing, calcining, and screening operations

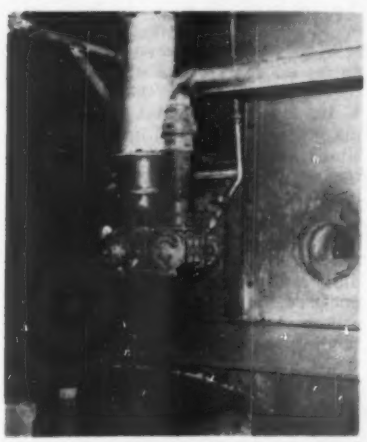
material dropping into steel silos below. The three-deck screen eventually will make four sizes of kiln feed to serve four kilns.

There are six steel silos, each holding 620 cu. yd. of material. They are 55 ft. high, 22 ft. in diameter, and have 50 deg. coned bottoms so they are self-cleaning. Discharge gates are of the gravity type with a horizontal slide gate imposed above the lower gate.

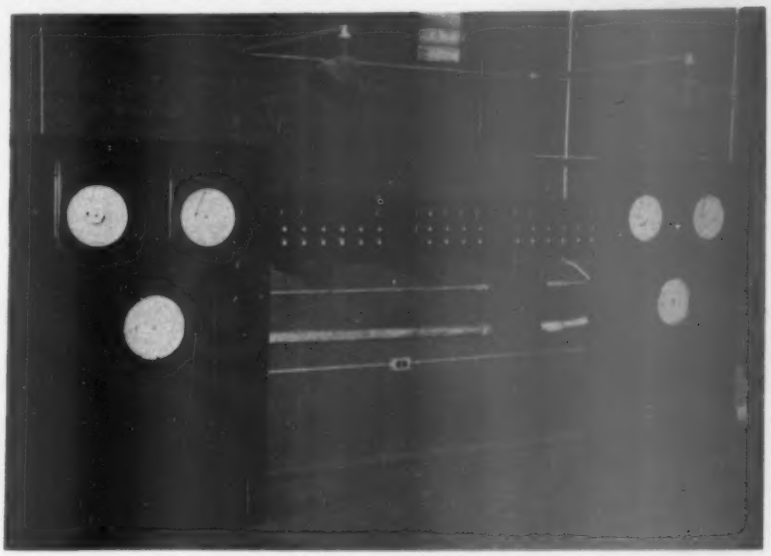
Calcining Operations

Production from the new lightweight aggregate plant centers around the use of two 8- x 125-ft. Allis-Chalmers rotary kilns fired with natural gas. The raw crushing and preliminary processing section of the plant is all on the south side of the kilns making it possible to install additional kilns on the opposite side without altering the general lay-out, or interfering with the operation of existing facilities. Burning technique involves supplying each of the kilns with a sized feed, one kiln being fed a $\frac{3}{16}$- to 1-in. product and the second kiln, a 1- to 2-in. size. Feeding the kilns in this manner permits a closer control over the burning process.

The two Allis-Chalmers kilns are supported on three heavy concrete foundations, each kiln being provided with an auxiliary gasoline engine to drive the units should the purchased electric power fail. The bronze-bushed bearings on the kiln trunnion rolls are air cooled. Each kiln is fired with a Hauck combination natural gas and oil burner. The first 35 ft. of kiln lining is with 60 percent alumina brick with the balance of the kiln using 40 percent alumina units. The B.t.u. input per cubic yard of burned material is 2,200,000. The kilns are installed on a pitch of 0.5 in. per foot and operate at 1½ r.p.m. It requires about 45 min. for the feed to discharge at the hot end. Each kiln has a capacity of 300 cu. yd. per 24 hr. An inclined belt conveyor with a control gate feeding the belt delivers the sized feed from each silo to each kiln.



Kiln is fired with combination oil and natural gas burner



Latest type kiln firing control instrument panels

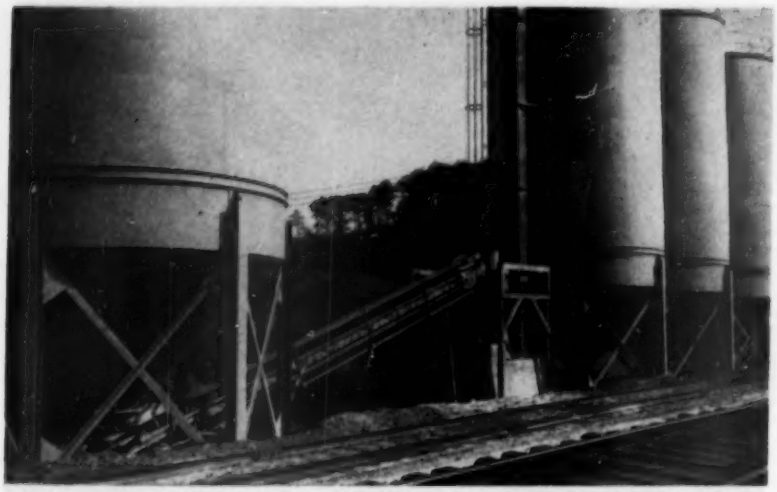
At the high end of the kilns, where the slate is introduced, an operating temperature of 700 deg. F. is maintained. As the material moves down the kiln, moisture and organic material are vaporized with actual bloating being accomplished in the hot zone at temperatures in the 2000-deg. range. At this operating temperature, the material is a semi-molten, plastic mass in which remaining volatile constituents in the slate expand as a gas and forms the myriads of tiny air cells that gives the material its lightweight properties. The finished material is a dark gray to black material and compares very favorably with the various Haydites manufactured in other areas. However, the raw material, in concrete, does appear to give a lighter colored block than many of the lightweight materials made in rotary kilns.

The degree of bloating in each kiln is controlled by the use of Foxboro Radiomatic temperature recording units, having a range of 1200 to 2500 deg. F. A recording Foxboro pyrometer with a range from 0 to 1000 deg. F. is used to record the temperatures in the feed end of each kiln. Hays differential recording draft gauges also are available on each kiln for added quality control features. The recording equipment is all mounted on a neat panel in the kiln room where a set of push buttons have been installed so that the kiln operator can control the operation of the entire plant. The electrical distribution system for the plant is divided into three sections; raw, kiln, and finish end. Each of these sections has its own set of push button controls, but the main controls for the three sections centers in the kiln room. All controls are G.E.

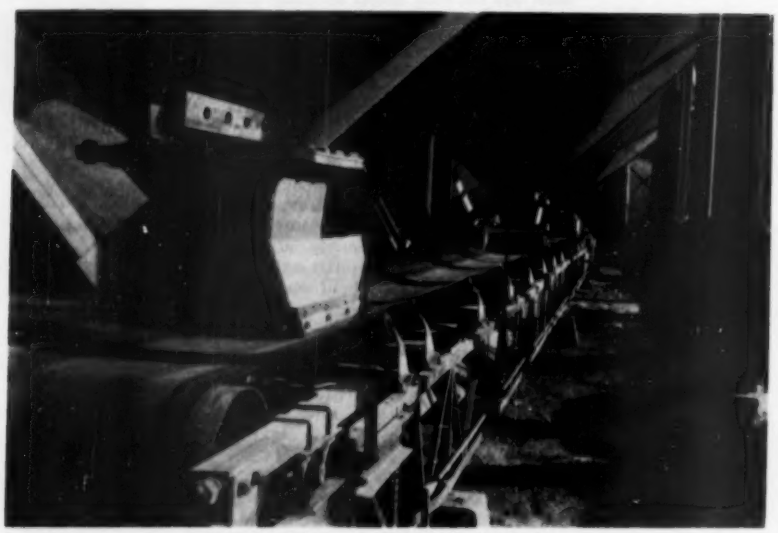
Each kiln is equipped with a Multiclone dust collector followed by individual spray towers. The Multiclones' discharge is through a motor driven rotary valve to a funnelled outlet where it meets a tangential spray of water with the pulp flowing to a retaining pond. The effluents from the spray towers are sent to the same retaining pond. The recovered dust from the Multiclones is mostly a minus 50 micron product, and is said to be practically all a calcined shale. Its use as a pozzolanic material is being investigated. Each kiln has a Claridge exhaust fan to maintain proper draft conditions. Exhaust gases from the kiln are practically free from entrained solids, making the new plant of the Georgia Lightweight Aggregate Co. one of the cleanest in the industry.

Hot clinker discharged from the kilns is in the 3½- to 0-in. range. Each kiln is provided with a 5½- x 70-ft. rotary cooler that is brick-lined for 30 ft. The coolers are installed in a straight line with respect to the long axis of the kilns with the upper end of the coolers being under the kiln control room. Water sprays are installed on the outer surface of the coolers as it was found that it was desirable to maintain a lower and more uniform temperature in the kiln control room. By reducing the radiation from the outer surface of the coolers, and the use of a ventilating fan in the control room, more uniform operating temperatures in the room are maintained. The coolers reduce the temperature of the clinker to 125 deg in the 20 min. of residual time in the units. Cold air drawn through the coolers is raised considerably in temperature during its passage through the units, and this air is used to support combustion in the firing hoods with resulting economies in fuel.

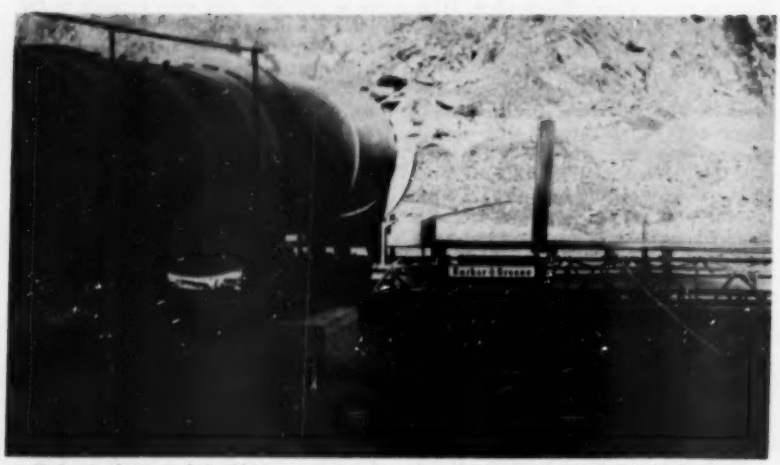
There are three general classifica-



Reduction crusher, to the right, crushes clinker which is elevated to the top of the finish bins for further screening



Blending belt conveyor under the finish silos



Clinker cooler is cooled with water sprays. Conveyor with heat-resistant belt in background

tions for cooling a hot material, such as artificial lightweight aggregates: (1) quick quenching, such as dropping the red hot material in cold water; (2) relatively rapid cooling as illustrated by the coolers in use at Rockmart; and (3) slow cooling of the clinker mass in a storage pile. The choice of a cooling system does not change the chemical analysis of the material, but it can change its physical properties. Slow cooling tends more towards a crystalline structure. Cooling, as practiced at the Georgia Lightweight Aggregates Co. is designed to "freeze" the cellular structure, to minimize crystallization, and to produce a hard, vitreous material with its thousands of tiny air cells being separated from neighbor cells by a thin cellular wall or membrane so that the final material will have high structural strengths. Galite has less than half the weight of the material from which it was made, and Galite will float in water indefinitely. The coolers in use were built locally.

Three sizes of finished material are processed: fines 0 to $\frac{3}{16}$-in.; an intermediate size, $\frac{3}{16}$ to $\frac{3}{8}$-in.; and a coarse size, $\frac{3}{8}$ to $\frac{3}{4}$-in.

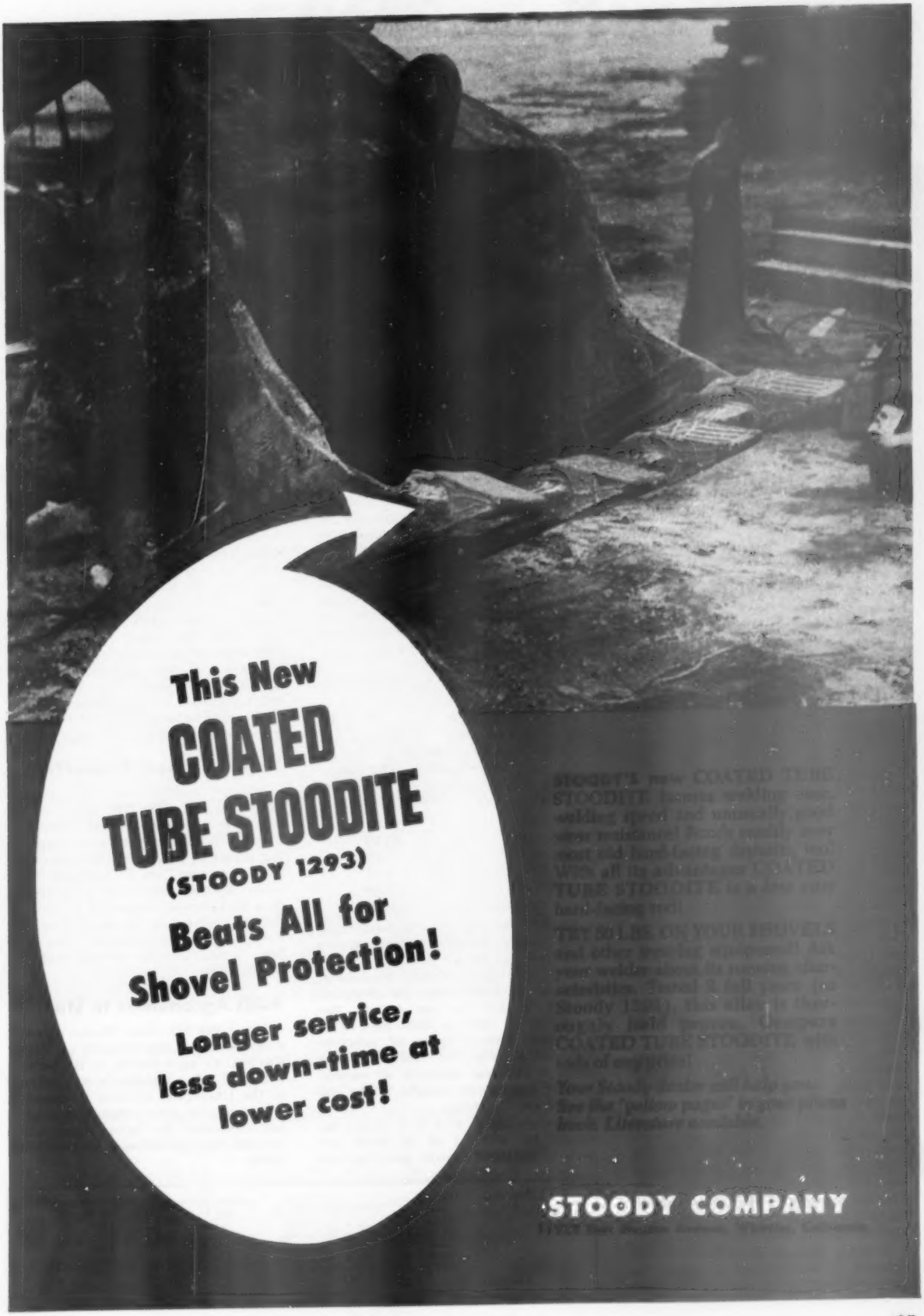
Storage and Shipping Facilities

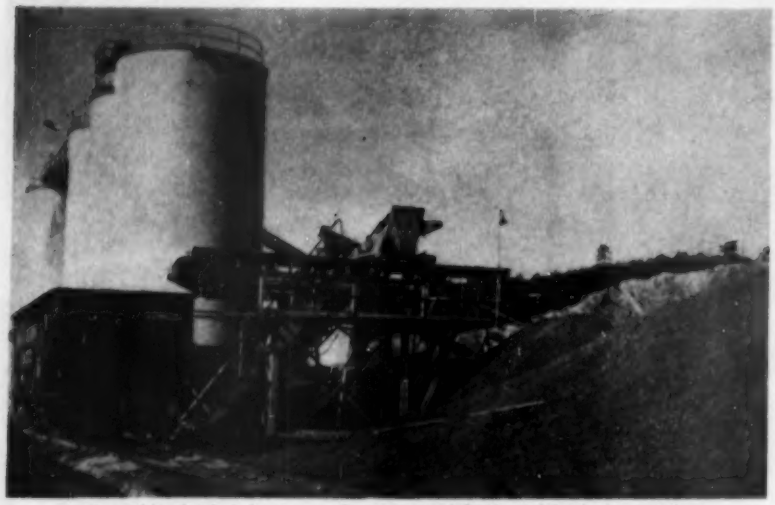
The clinker from each cooler falls to a heat resistant conveyor belt, and is delivered to a long inclined belt conveyor serving a third totally enclosed Seco double-deck vibrating screen mounted over a steel silo similar to the silos used for raw storage bins. This silo is referred to as the "Clinker" silo and is an intermediate storage bin ahead of the finish crusher.

After crushing and sizing, the three sizes of material are stored in three silos alongside the railroad switch track, and are in a straight line with the clinker silo. The latter, however, is apart from the three finished silos with the space between occupied by the finish crushing assembly.

The screen over the clinker silo can remove the $\frac{3}{8}$-in. to $\frac{3}{4}$-in. size in which event the material falls to a horizontal belt conveyor mounted on top of the section, which connects the clinker silo with the silo for the $\frac{3}{4}$-in. finished material. The remaining fractions then fall into the clinker silo. Under the clinker silo is a short inclined belt conveyor that takes material from the clinker silo and delivers it to a No. 38 ½ Kennedy-Van Saun gearless crusher. A bucket elevator receives the crusher discharge and delivers it to a fourth, totally enclosed, 5- x 12-ft. Seco three-deck screen mounted on top of the silo holding the $\frac{3}{4}$-in. finished Galite. Finished material of this size is chuted from this screen to the bin below. Coarse material from the top deck falls to a second horizontal belt conveyor mounted on top of the bins par-

(Continued on page 98)


This New
COATED
TUBE STOODITE
(STOODY 1293)
Beats All for
Shovel Protection!
Longer service,
less down-time at
lower cost!
STOODY COMPANY



Reversible, shuttle belt conveyor for car or truck loading of finished materials

alleling the one previously mentioned, and delivers material back to the clinker silo. Two other belt conveyors mounted one above the other deliver the fines (0 to $\frac{3}{16}$-in.) material to the far silo of the three with the shorter belt serving the bin holding the intermediate size Galite ($\frac{3}{16}$-in. to $\frac{3}{8}$-in.). Thus it will be seen that the fourth Seco screen essentially prepares four sizes; the plus $\frac{3}{8}$-in. which is moved by belt conveyor back to the clinker silo with the other three sizes being delivered to their respective bins.

The finished Galite is fed from the bottom of each bin to a flat running belt conveyor that delivers to an inclined belt conveyor serving a cross shuttle loading belt. This belt is reversible so that it can load open cars, or trucks. Galite can be shipped in separate sizes or blended on the first belt to meet any specification within the size limits. When a blended product was shipped, it was found desirable to have better mixing of the blend, so a company-made mixer was installed between the belt under the silos and the inclined off-bearing belt. This consists of a relatively high speed, cross shaft with adequate paddles at right angles to the shaft. The shaft is driven from the tail pulley of the off-bearing belt. All Galite discharging from belt to belt must pass through the paddle blades. This, along with the (twice) transfer of material from belt to belt, and finally to the cars gives the desired mixing. Open top cars are loaded on a struck volume basis to insure accurate delivery of the yardage the car will hold. This procedure slows down the loading somewhat but is a precautionary measure against short yardage deliveries. The entire operation requires 24 men to handle all three shifts, including quarry and office.

Ground storage facilities are for finished Galite provided alongside the main railroad switch serving the plant so that cars can be loaded, using a Lorain clamshell. Similarly, clinker can be ground-stored near the toe of the long belt serving the clinker storage bin. A steel hopper has been provided near the lower end of this belt so the material can be handled by the clamshell back into the circuit as desired. The plant was built under contract with the Union Construction Co., Atlanta, as the prime contractors.

Weights of the finished Galite product by sizes is as follows:

Coarse, $\frac{3}{8}$-in. to $\frac{3}{4}$-in., 1000 lb. per cu. yd.

Intermediate size, $\frac{3}{8}$-in. to $\frac{3}{16}$-in., 1050 lb. per cu. yd.

Fines, $\frac{3}{16}$-in. to 0, 1400 lb. per cu. yd.

The raw shale used for the manufacture of Galite has the following chemical analysis:

SiO_2	64.30
Al_2O_3	20.45
Fe_2O_3	7.00
CaO	4.21
MgO	3.18
Free carbon	0.50

An 8- x 8- x 16-in. standard block using Galite weighs 26 lb. air-dry compared to 40 to 47 lb. for the heavier aggregate blocks. Structural concrete of Galite can be designed for 85 to 110 lb. per cu. ft. for strengths of 1500 to 5000 p.s.i. with the lesser weight types of concrete intended mainly for roof and floor slabs. Structural concrete of normal heavier aggregates weighs in the 150 lb. per cu. ft. range.

Concrete block, 8- x 8- x 16-in., designed for a yield of 28 block per sack of portland cement gave the following compression strengths at 7 days of age as shown in table below:

Officers of the Georgia Lightweight Aggregate Co. are: Alex MacDougald, chairman-of-the-board; Otto C. Frei, president; R. F. Holohan, vice-president; Gilmer MacDougald, secretary-treasurer, all of Atlanta, Ga. Alex MacDougald, and Gilmer MacDougald and R. F. Holohan are associated with the MacDougald Construction Co. of Atlanta. Sales activities for the Georgia Lightweight Aggregate Co. are under the direction of Lane W. Wilcox, formerly manager of the Eugene, Ore., plant of Smithwick Concrete Products Co. operation. Company offices are maintained at 1625 Northside Drive, N.W. Atlanta, Ga.

Specimen No.	Weight Lbs.	Dimensions, Inches	Gross Area Sq. In.	Compressive Strength Lbs. Per Sq. In.
1	29.50	7⅝ x 7⅝ x 15⅝	119.1	1092
2	31.05	7⅝ x 7⅝ x 15⅝	119.1	1180
3	30.00	7⅝ x 7⅝ x 15⅝	119.1	1209
4	32.00	7⅝ x 7⅝ x 15⅝	119.1	1234
5	29.70	7⅝ x 7⅝ x 15⅝	119.1	1024
Average				1148

Liming Bulletin

THE NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION recently announced the publication of Bulletin No. 385, "Lime and Fertilizer Pay Off." Written by W. L. Nelson, professor of agronomy and head of soil fertility research at North Carolina State College, the 24-page, illustrated bulletin presents information on the response of plants and crops to plant nutrients, as related to soil fertility level, crop requirements and rotation practices, and what these responses may mean in terms of net return. The response of several crops to varying levels of lime and fertilizer are shown graphically. The bulletin is available from the Department of Agricultural Information, Ricks Hall, State College Station, Raleigh, N. C.

Italian Cement Production

ITALIAN CEMENT PRODUCTION reportedly rose to 4,300,000 tons in the first seven months of 1953, compared with 3,700,000 tons for the corresponding period of 1952. Domestic consumption of cement rose to 4,400,000 tons, from 3,800,000 tons in the 1952 period. New facilities are expected to increase future production by about 1,000,000 tons. Exports up to 50,000 tons have been authorized to Africa and the Middle East.

Adds Agronomist to Staff

LEE LIME CO., Lee, Mass., recently announced the appointment of Victor Barden, an agronomist, to its personnel staff. Mr. Barden is a graduate of the University of New Hampshire. The company also announced that it has expanded its sales organization in both the agricultural and building fields.

THE NEW CATERPILLAR D8 TRACTOR

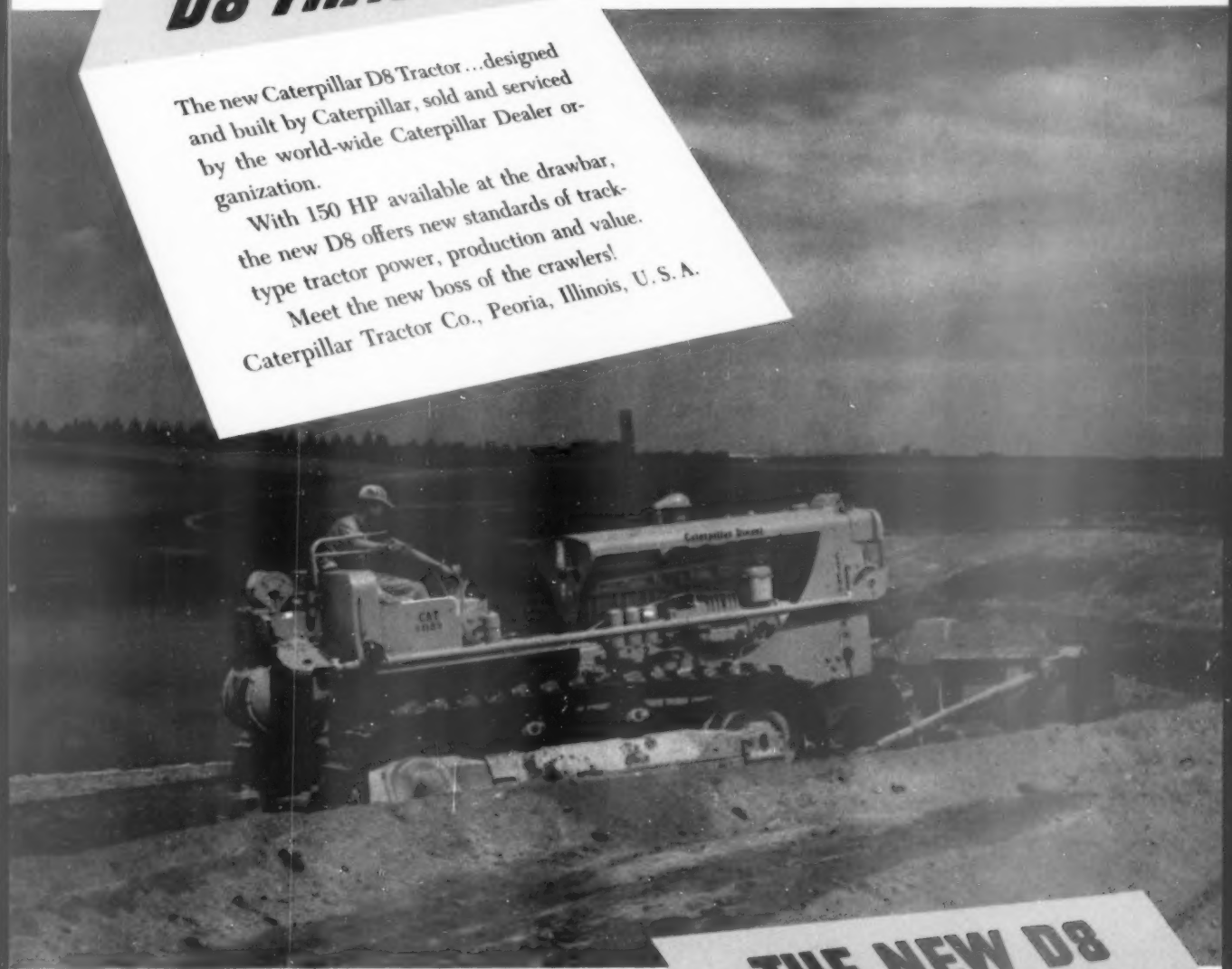
More Power... More Profit... More Production...

The new Caterpillar D8 Tractor...designed and built by Caterpillar, sold and serviced by the world-wide Caterpillar Dealer organization.

With 150 HP available at the drawbar, the new D8 offers new standards of track-type tractor power, production and value.

Meet the new boss of the crawlers!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



THE NEW D8 Boss of the Crawlers

- The new D8 has more drawbar horsepower...horsepower that works for you.
- The new D8 is compact...it retains the maneuverability needed in tractor applications.
- The new D8 is versatile...matched to Caterpillar-designed Bulldozers, Scrapers, Rippers and Pipe Layers.
- The new D8 is also a pusher...available attachments make this machine a powerful push tractor.

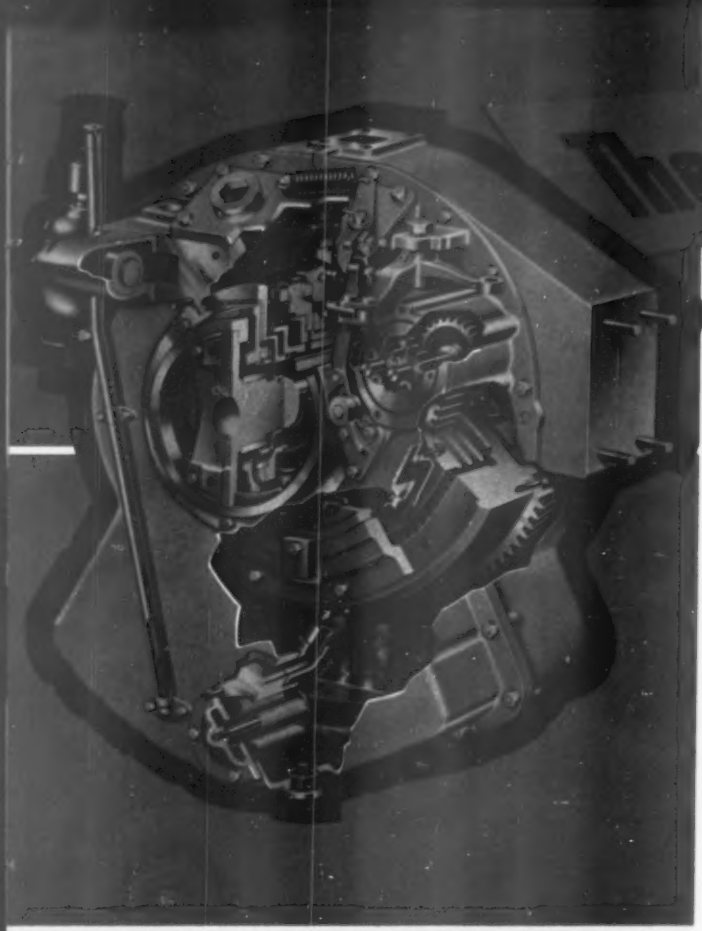
CATERPILLAR

REGISTERED TRADE MARK ®

150 Drawbar Horsepower Provided by Caterpillar D8 Engine

The new high performance of the Caterpillar D8 Tractor stems from the 185 HP, 1200 RPM diesel engine. Important new features, built into the time-tested and job-proved Caterpillar design, contribute to longer engine life and decreased operating costs as well as higher power. Some of these features are: new cylinder head incorporating valve rotators and hardened valve seat inserts, new camshaft, aluminum alloy pistons with stainless steel heat plug in the high temperature zone and a cast-in iron band for the top piston ring groove. A larger oil pump driven from the front of the crankshaft has an exclusive throttling valve pressure control which assures correct lubrication for all moving parts from the first turn of the crankshaft.

This powerful engine, with these and many other advanced features, is one of the big reasons why the D8 gives you more value than ever before.



The Oil Clutch

Exclusive with Caterpillar Profitable to You...

Only Caterpillar offers you the long life and low maintenance cost of the oil clutch. The outstanding feature of this advanced clutch is that oil films absorb the friction and heat. The metallic friction surfaces do not come into contact until the last revolution or two before engagement. The clutch has its own lubrication system with gear-type pump and suction screen. The pump supplies oil under pressure to the hydraulic booster, which makes the clutch exceptionally easy to operate. Oil is also delivered to the inner diameter of the three clutch plates. This continual lubrication and cooling is the principal reason for much longer periods between adjustment and replacement than is possible with the conventional dry clutch. The oil clutch is another big reason why the D8 is a better buy.

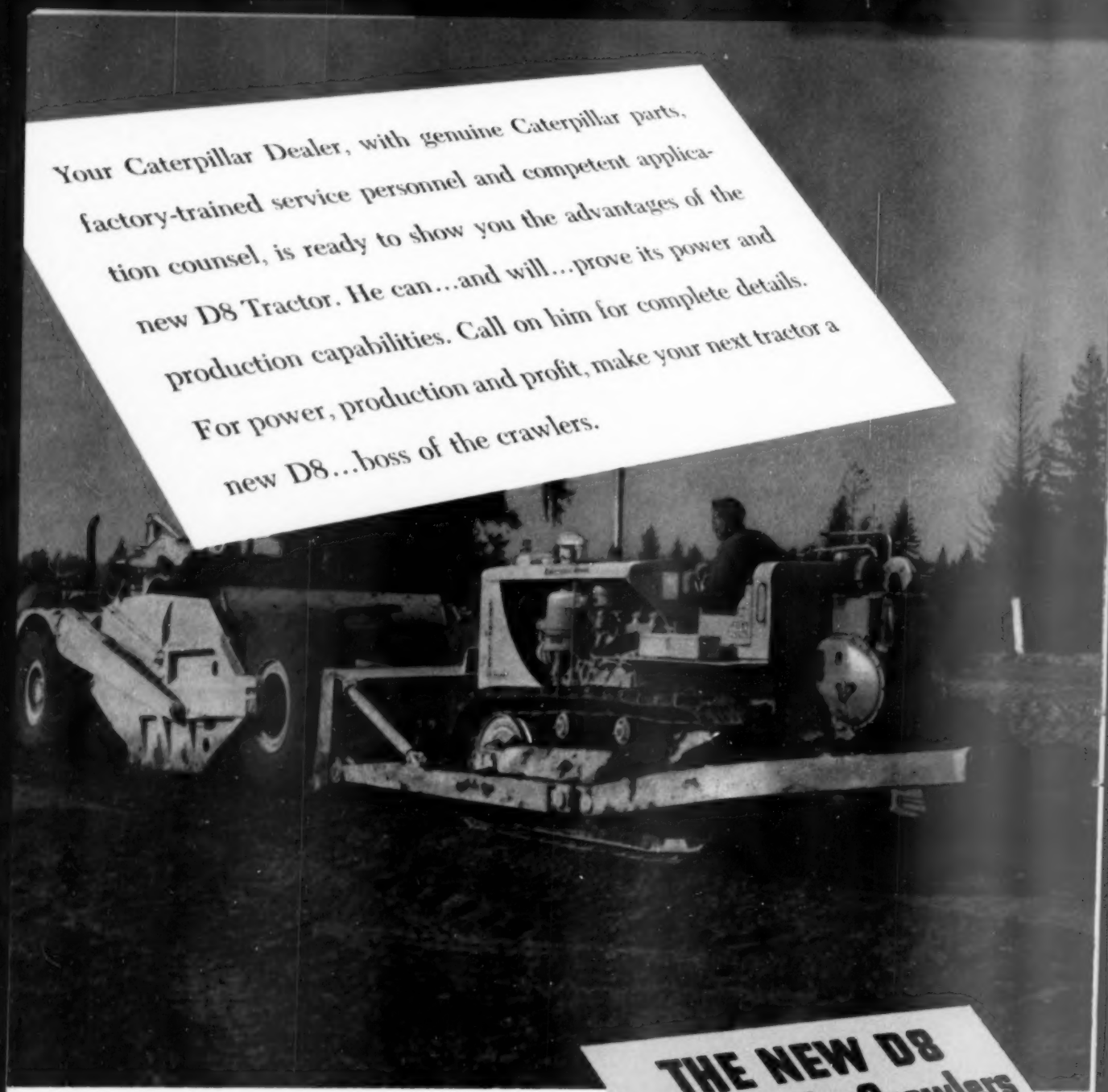
THE NEW D8 GIVES YOU...

- **150 Drawbar Horsepower**
- **New Long Life Engine Features**
- **Exclusive Oil Clutch**
- **Flywheel Clutch Booster**
- **New High-Strength Frame**
- **"Hi-Electro" hardened track grouser tips**
- **Self-energizing Steering Clutches**
- **New, Large Air Cleaner**
- **Weight 38,155 lbs. (shipping weight)**
- **Compact Fuel Injection Equipment**
- **Double Universal Joint to Protect Clutch and Transmission Bearings**

Caterpillar

REGISTERED TRADE MARK ®

THE NEW D8 Boss of the Crawlers


Your Caterpillar Dealer, with genuine Caterpillar parts, factory-trained service personnel and competent application counsel, is ready to show you the advantages of the new D8 Tractor. He can...and will...prove its power and production capabilities. Call on him for complete details. For power, production and profit, make your next tractor a new D8...boss of the crawlers.

THE NEW D8
Boss of the Crawlers

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

The new Caterpillar D8 Tractor offers new highs in earthmoving production in push-tractor operations. The D8, equipped with No. 8S Bulldozer, heavy duty track roller guards, crankcase guard and tandem pusher frame, will cut your work cycles to a minimum.

Fast and maneuverable, the D8 applies a full 150 HP to the job of loading your hauling units in new record times. Push-loading, singly or in tandem, is provided to meet the conditions of your job.

PRINTED IN U.S.A.

Better Blasting Practices Through Seismograph Studies

SEISMOLOGY has been found invaluable by the legal profession and insurance underwriters in their work. However, the most practical purpose, and one which has been overlooked by many quarry operators, is the application of seismological studies to improve methods of blasting in an engineering sense.

Machine that records earth tremors on a tape which becomes permanent record of blast

To this end, Jules E. Jenkins, head of Vibration Measurement Engineers, Chicago, has developed a new instrument called the Seismolog which, it is anticipated, will become a regularly used tool in blasting operations. This new type seismograph is said to be very accurate, yet easily operated and durable for rugged field work. These instruments will be made available so that one or more instruments may be on hand for routine use with every shot. Trained personnel, very often traveling long distances, will not be necessary to operate the instrument. Any intelligent workman can operate it, with the records registered by sealed camera, to be given expert analysis with a report.

The new instrument is compact, 8- x 12- x 18-in., it weighs only 25 lb., and can be easily transported and used where it is needed. It does not require any electrical connections. Highly sensitive, it records vertical, horizontal and transverse earth tremors on a tape. The tape, which becomes a permanent record, tells a graphic story to a skilled analyst. This analysis can lead to changes in methods to bring about economies, increased production and better controls, and it offers a visible, irrefutable piece of evidence that may save quarry operators a great deal of money through liabilities in law suits.

It is planned to supply the Seismolog on a rental basis. Any intelligent workman can place the instrument and start it at the synchronized time of blast. The recording is removed intact with the sealed camera unit and is sent, with a copy of the filled in report form, to Vibration Measurement Engineers for analysis, and a report will be returned to the client along with the reloaded camera unit. The report form and recording are properly indexed and permanently filed. For this service and maintenance of the Seismolog, a moderate fee will be charged. The new instrument was displayed for the first time at the National Crushed Stone Association convention exhibit at the Conrad Hilton Hotel, Chicago, February 22 to 24, and attracted a great deal of interest.

Rotary Drill Installation

CALAVERAS CEMENT CO., San Francisco, Calif., has placed a new 54-ton Bucyrus-Erie rotary drill, reportedly the largest industrial drill in the world, into operation at its San Andreas, Calif., plant. According to William Wallace Mein, Jr., company president, Calaveras is pioneering in the use of the drill, both in the cement industry and in the West. There are said to be only ten of the drills in operation at the present time, the other nine being concentrated in the East.

The equipment features an unusual mechanism which permits extension of the drill stem without manual help. An electrically powered motor reverses itself, uncouples the end of the stem in the ground, wheels in an extension for the stem, attaches it to the portion still in the ground, and resumes the drilling operation. It can drill continuously to any depth, but in the Calaveras quarry, it will be used for drilling primary blast holes to depths of 90 ft. or less. The maximum bore is 12¾ in. dia. Calaveras will use it to drill 9⅞-in. holes. The drill stands 54 ft. 2 in. high in working position and is mounted on 42-in. crawler treads. Its variable speed electric motors are regulated by Ward-Leonard electric controls.

Management Award

THE ARUNDEL CORP., Baltimore, Md., large producer of sand, gravel and ready-mixed concrete, for the fourth consecutive year, has been certified as "excellently managed," by the American Institute of Management, New York, N.Y., a non-profit organization devoted to the study and improvement of corporate organization and management.

The institute uses a point system for rating ten key factors in each company: Economic function, corporate structure, health of earnings growth, fairness to stockholders, directorate analysis, research and development, fiscal policies, production efficiency, sales vigor and executive evaluation. Only 348 companies in the United States and Canada, out of the 3000 leading concerns whose methods were studied, were found eligible to receive the management award for the year 1953. The philosophy behind these awards, according to an institute official, is to focus attention upon those companies whose practices should be emulated by others, to increase efficiency and insure stability for employes, shareholders and the economy as a whole.

PETTIBONE SAND & GRAVEL CO., Cleveland, Ohio, was recently incorporated by Louis A. Blue, with 250 shares of common stock, no par value.

Workmen are shown assembling Calaveras Cement Co.'s new large industrial drill for use at the San Andreas quarry. The equipment's own power was used to unload it from the flat car on which it was delivered, as well as to perform other assembling operations. Calaveras is pioneering in the use of the drill in the cement industry

Letter to the Editor
Quadrant Tile In Kilns

SIR:

There seems to be some misconception in the minds of the industry as to who was responsible for the development of the quadrant tile in rotary lime kilns. Perhaps I am the only one living who can straighten out this matter, and I can only do it to a partial extent.

In 1915, the then Charles Warner Co. was erecting a new lime plant which included an 8- x 150-ft. rotary kiln.

At that time, a Mr. Jones (whose initials I have forgotten) had a patent on the burning of limestone in a rotary kiln. Also he had two small rotaries at Natural Bridge, New York. I believe this plant has long since been dismantled.

Although Mr. Jones' patent was probably not good, his demands were moderate, and we took a license for the benefit of his advice on the calcination of lime in rotaries. In the service he rendered us at that time, he told of how he used long tile to divide the kiln into quadrants, giving us the details of the design and his experience. We adopted it in the kiln at that time, but unfortunately, the tile did not arrive until the lining of the kiln was almost complete. As a result we got in only 10 ft. at the feed end.

These tile were difficult to maintain, and when they finally came out, they were not re-installed as we could not detect any particular loss in efficiency due to their elimination. From our later experience, this is to be expected. The proper location of refractory tile is well down the kiln, and should bracket the point where incipient calcination begins.

This construction was then lost to the industry until I resurrected it in 1946 when we extensively revamped this same kiln. Mr. Azbe picked this up from us since his keen mind on thermal matters saw the advantages, and these have been frequently discussed in your publication.

I do not know the history of such a construction in Germany, but Mr. Jones had apparently used this for many years prior to 1915 in his plant at Natural Bridge, New York.

Very truly yours,

Irving Warner
Vice President
Warner Company

Honor Stanton Walker

AN INDUSTRY DINNER was given in honor of Stanton Walker, director of engineering of the National Sand and Gravel Association and the National Ready Mixed Concrete Associations by 250 members and guests of the two associations in Southern California on January 25 at the Biltmore Hotel, Los Angeles, Calif. The occasion afforded the members was the visit of Mr. Walker to Los Angeles to be one of the principal instructors at a Short Course in Ready Mixed Concrete at the University of California.

Guests included engineers from the specifying and supervising agencies of the state, county and city as well as the staff of the Corps of Engineers of the United States Army. Also present were prominent structural engineers and the presidents of the Southern California chapters of the American Society for Testing Materials, the American Society of Civil Engineers and the American Institute of Architects; also presidents of the Structural Engineers Association of California and the Southern California Association of Structural Engineers.

In addition to local members, the guests included sand and gravel and ready-mixed concrete producers from Honolulu, Las Vegas, Nev., and Phoenix, Ariz., as well as from the adjoining counties of Orange, Riverside, San Bernardino, Ventura and Kern.

Robert Mitchell, president of Consolidated Rock Products Co., Los Angeles, and a director of the National Ready Mixed Concrete Association, served as master of ceremonies.

Lime Company Reorganizes

THE CHAZY LIME & STONE CORP., INC., Chazy, N.Y., was recently acquired by a group who have had considerable experience for many years in the manufacture of high calcium lime, and who will henceforth operate the plant under the name of International Lime & Stone Corp.

The lime plant at Chazy is being completely rebuilt and the first unit, which will have an 80-ton daily capacity, is expected to be in production by mid-summer. In addition to the rebuilding of the lime plant, the hydrate plant is also being rebuilt.

The newly elected board of directors is composed of the following members: Judge Andrew Ryan, president; J. Alex Stewart, vice-president and managing director; T. A. Rourke, vice-president and general manager; C. N. Knowles, secretary-treasurer; F. R. Graham, Jr., director; T. L. Dunbar, director; and Frank Ryan, director. The Dallock Corp., New York, N.Y., has been appointed as sales representative.

COSMOPOLITAN SAND & GRAVEL CO., Cleveland, Ohio, has been incorporated with 100 shares of no-par common stock. The incorporator is Dominick E. Bartone.

Dinner at which Southern California Rock Products Association and Southern California Ready Mixed Concrete Association honored Stanton Walker, director of engineering, National Sand and Gravel Association and National Ready Mixed Concrete Association

Italcementi Twin Crushing Plants for Calusco

Equipped by KENNEDY...

This is only one of two identical Calusco crushing plants located at separate quarries. Capacity, 2000 metric tons daily.

each producing 1200 metric tons daily of high quality, uniform cement!

Primary gyratory crushers installed at both Calusco crushing plants.

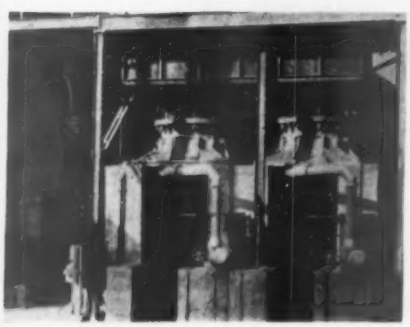
Secondary crushers installed at both Calusco crushing plants.

KVS engineers handled this job from plant layout and flow charts to the designing, building and installing of all major machinery and equipment.

Two of the best equipped cement plants in the world, the twin CALUSCO plants were designed to deliver sufficient crushed and sized limestone for an ultimate capacity of 2000 metric tons per day of Portland cement clinker.

KVS machinery was selected in preference to all other makes of cement equipment as best suited to do the work required. Operating records show that the estimated capacity is being exceeded, maintenance costs held to a minimum and quality standards of cement above required minimum.

Look to Kennedy, *first*, for the best in cement, crushing and mining machinery. Over a half-century of engineering leadership is at your disposal.



WORLD FAMOUS KENNEDY MACHINERY AND EQUIPMENT

- Double discharge gyratory crushers
- Swing Jaw Crushers
- Slugger Rolls
- Rotary Kilns
- Coolers—Dryers
- Classifiers
- Hydrators
- Air Swept Tube Mills
- Rod or Ball Mills
- Vibrating Screens
- Rock Feeders
- Pre Heaters . . . Deheaters
- Pulverized Coal Firing Systems
- Pneumatic Transport System

SEND FOR LITERATURE DESCRIBING KVS MACHINERY AND EQUIPMENT

IT COSTS LESS.. TO OWN THE BEST!

KENNEDY-VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

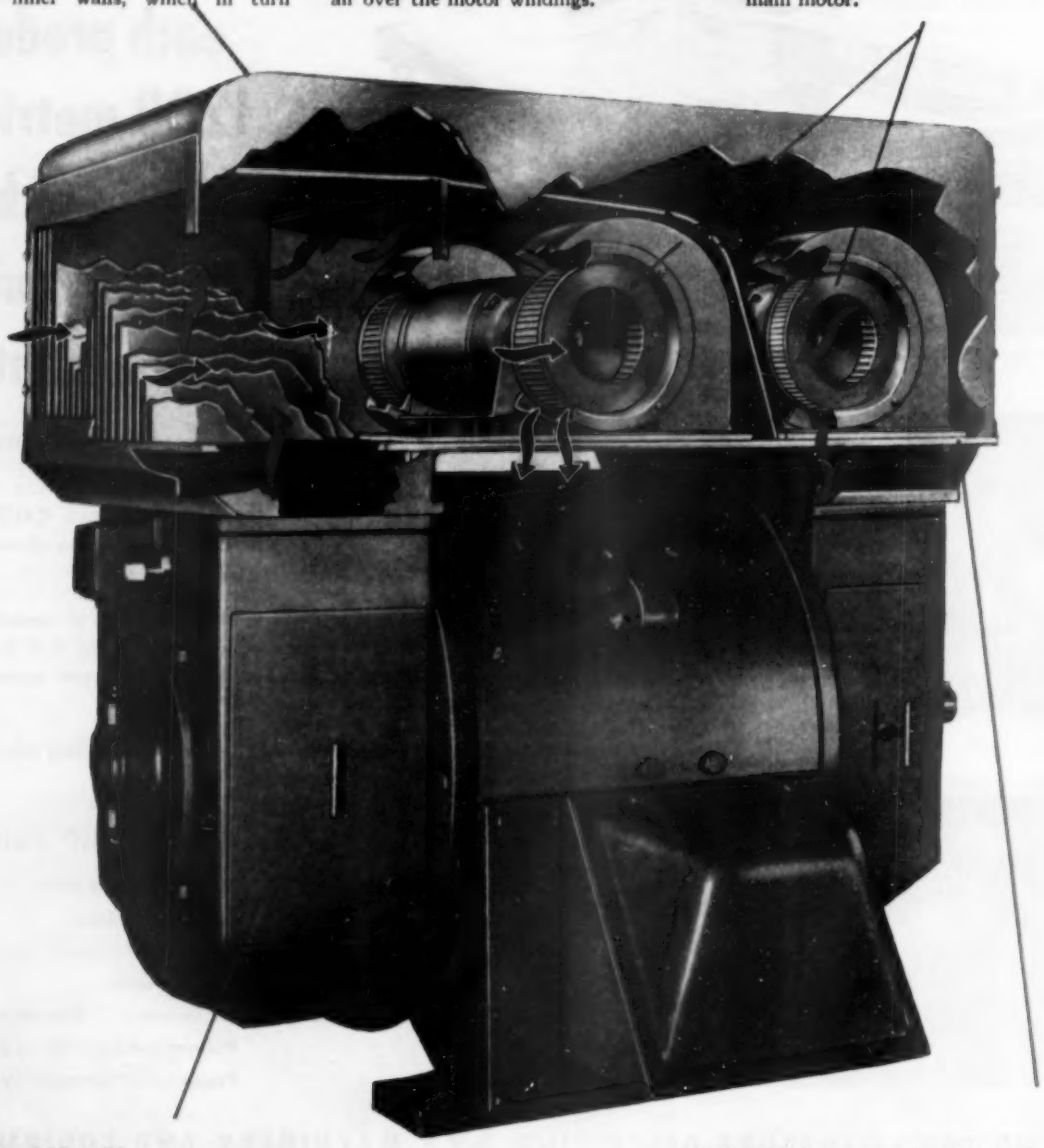
TWO PARK AVENUE, NEW YORK

FACTORY DANVILLE, PA.

NEW G-E UNIT-COOLED

DOUBLE VENTILATION SYSTEM: Outside room air (black arrows) enters cooling unit through external portion of the heat exchanger. This air cools the exchangers inner walls, which in turn cool the permanently trapped air. Clean air (red arrows) remains within the unit and never mixes with outside room air. End blower continuously circulates clean air over the motor windings.

TWO BLOWERS operate the double ventilation system and are powered by separate General Electric totally-enclosed fan-cooled motors independent of the main motor.



INSPECTION OPENINGS are gasketed for extra protection. They are easily accessible with no tools required.

COMPACT, top-mounted cooling unit, 37% smaller than previous models, falls within over-all length and width of main motor and is easily removed if necessary.

Progress is our most important product

GENERAL ELECTRIC

D-C MOTOR

Gives you the benefits of d-c speed control — the protection of totally enclosed construction.

WHAT IS THE UNIT-COOLED D-C MOTOR?

It is a Type CD machine with an integrally mounted air-to-air-heat exchanger. Within the exchanger are two separate blower assemblies which operate the unit's double ventilation system. Permanently trapped air cools the motor and in turn is cooled by the outside air being pulled through the heat exchanger.

WHERE DO YOU USE IT?

The new G-E Unit-cooled d-c motor is specifically designed for environments which make open or partially enclosed motors difficult or expensive to maintain. When dampness, metal particles, dust, dirt, oily vapors, fly ash or other harmful airborne materials are present, this new, better protected motor offers real operating economies.

WHAT ARE ITS ADVANTAGES?

WIDE SPEED RANGE OPERATION. Independent ventilation system allows full use of inherent speed ranges of the d-c motor. Ventilation is not dependent upon main motor speed.

LOWER INSTALLATION COST. Unit has no external duct work, blowers or air filters to install. A completely self-contained unit, it can be relocated or replaced easily and quickly.

LESS MAINTENANCE. There are no air filters to replace or clean. Self-cleaning vertical heat exchanger plates are used instead of horizontal type. Inspection doors are gasketed and easily accessible with no tools needed.

SMALLER SIZE. Unit-cooled d-c motors are built in smaller frames than non-ventilated or fan-cooled motors of the same rating. This gives you smaller size, less weight and lower armature inertia which is important in applications which require frequent and rapid speed changes or reversals.

AVAILABLE IN *ALL* STANDARD RATINGS from 15-200 hp, in constant and adjustable speed types. For more information on the new G-E Unit-cooled motor, contact your nearest G-E Apparatus Sales Office or fill out the attached coupon for a copy of the Unit-cooled motor bulletin. General Electric Co., Schenectady, N. Y.

MOUNTS AT ANY ANGLE. Here two G-E Unit-cooled d-c motors drive a boring machine used for boring diesel engine blocks.

NO DUCTS OR PIPING. Ventilation system of G-E Unit-cooled d-c motor is self-contained. Smooth lines facilitate cleaning.

General Electric Co.
Section A 810-1
Schenectady 5, New York

Please send me a copy of Bulletin GEA-6091 on the new G-E Unit-cooled d-c motor.

( ) for planning an immediate project
( ) for reference only

NAME .....

COMPANY .....

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Level section of German autobahnen highway system with highway crossing in the distance

Studies of cements and aggregates, methods of mixing and placing concrete reveal practices and materials which have given the most satisfactory experience with the resulting pavement under heavy traffic

By OTTO GRAF*

CONCRETE DURABILITY of German Autobahnen Highways

SINCE THE AUTOBAHNEN SYSTEM was built a tremendous increase in traffic has occurred, in which many very heavy trucks have participated, and the loads carried are appreciably greater than what had been considered permissible. The ratio of heavy truck traffic to total traffic in our country is higher than in the U. S. A. or in England. Thus the permissible axle load has been raised from 8.5 to 10 tons since the Bahnen highways were built. This overloading is in my opinion a matter of serious technical concern, because repeated overloading has a marked detrimental influence on the life of these roads.

Cement

Nineteen years ago a small circle of leading engineers and chemists discussed the question, "What properties are necessary and desired for paving cements?"[1] Following this debate the following requirements have gradually been set up and the necessary precautions have been established: Good preparation of the cement, to have uniform properties with high Fe_2O_3 and moderate content of Al_2O_3 and MgO, high quality and uniform burning. Fineness of grinding limited so that the residue on the 176 mesh sieve shall be at least 5 percent. Initial set at air temperatures of 95 deg. F. to be not less than 1 hr. High flexural strength. Limitation of the shrinkage with the desire to obtain cements which, during occasional drying out of the concrete, brings small shrinkage stresses and thereby small retrogressions in the flexural strength. Delivery of the cements only after the 7-day strengths have been determined so that fairly well seasoned cement comes to the job. Large reserves of clinker and cement are desired so as to maintain as good uniformity as possible. Painstaking control of manufacture by skilled operators.

These requirements were met, and they proved to be quite dependable. Very few troubles were experienced; in such cases the specifications had not been followed. For instance, cements stored for too short a time were sometimes used and in hot weather shrinkage cracks resulted.

To add to our knowledge, several experimental stretches were built in 1935 to 1938.[2] These have demonstrated up to the present that with selected blast furnace cements or with iron-portland cements just as good pavements could be built as with portland cement.[3] Whether the cements chosen to meet our specifications with their given chemical composition developed a preferential showing can not as yet be determined, since the experimental stretches could not be evaluated for many years, during and right after the war. Some things are known, for instance, that cements rather high in alumina must be used with great care[4] and the same is true if the MgO content is high.[5] It is strongly recommended to use only selected cements for pavements. The necessary specifications are being revised.

Aggregates

The aggregate properties are controlled in the specifications by compressive strength and abrasion resistance tests, the shape being also considered. The content of low quality and harmful constituents is limited.

The specifications for the grading of the aggregates with special consideration to secure uniformity has proved to be most important. A good grading of the aggregate is especially decisive. The variations set up before the start of the job must be carefully controlled. The regularity of the size fractions with limitations of under and over sizes has been demonstrated essential innumerable times over all the world.

At the same time, several possible defects have to be watched for and eliminated, especially where previous damage has occurred. Sometimes too low a sand content may reduce workability badly or a too weak consolidation apparatus may cause trouble.

The regularity of the grading in our case covers the fractions: 0-3, 3-7, 7-15, and 15-50 mm., and, in special cases, the fraction from 0.2 mm. or 0-1 mm. in the sand is also specified, especially when the aggregate production involves the use of modern large area screens and when the overflow and storage are carried out so that a clean separation of the sizes is assured. The aggregate materials are blended from a continuously and steadily flowing stream into the bin and to the delivery point, so that any segregation by wind or rain is avoided.

Concrete Mixing

The concrete compositions are controlled by trial batches so that the best quality could be used in the pavements. The precautions for uniform

*Prof. Dr. E. H. Graf has recently completed 50 years of service with the State Testing Laboratory at Stuttgart and has been professor at the Stuttgart Technical High School. He has been extremely active in concrete and building materials circles in Germany and still participates in the technical councils on the Autobahnen as Chairman of the German Committee for Road Construction.

[1]**Graf Zement,** 1935, p. 349; **Beton und Eisen,** 1935, p. 59; **Forschungsarbeiter aus dem Strassenwesen,** Vol. 27, Berlin 1940

[2]**Dittrich, Fortschritte aus dem Strassen-und Tufbau** Vol. 5

[3]**Graf, Strasse und Autobahn,** 1952 p. 72

[4]**Graf und Wals. "Untersuchimg zur Querrissbildung auf einer Autobahnstrecke.** Bericht an die Direction der Reichs autobahnen" Berlin, 1940 (Observations on cracking of an Autobahn stretch)

[5]Dittrich, cit.2

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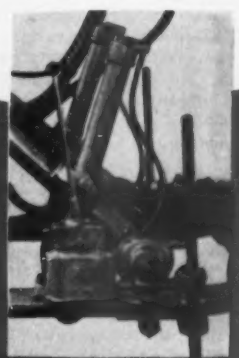

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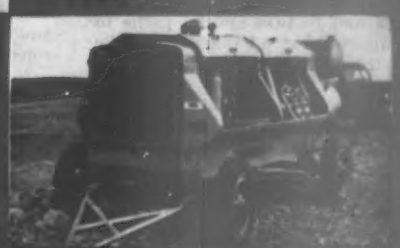

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German autobahnen concrete highway construction in a cut

production of the desired concrete must be carefully followed at the job, otherwise certain deviations may occur resulting from variations in the measuring, mixing, placing, distribution or consolidation. These variables are often unfortunately greater than is generally assumed. They will be considered next in detail.

Batching (a)

In our work, the cement and the sand are always weighed. The other aggregates can be added by volume. The usual silo scales are adequate, if properly calibrated, and if the flow of the material can be readily started and stopped and the procedure carefully followed. With the apparatus usually available in Europe until now we have had to take special pains to avoid appreciable mistakes with the single sizes. Therefore, it is necessary in large construction and, even more important in concrete products plants, to possess automatic scales not subject to errors. We have noted with keen interest the development during the past 25 years of American batching equipment which accurately measures concrete proportions.

Further precautions are necessary to maintain the water content of the freshly mixed concrete, with special controls because the aggregates are delivered with varying water content which could be altered at the job by rain, wind or sun. Since the accurate setting of the water content is a bit troublesome, it is recommended that the aggregate be held as constant as possible as to grading and weight. Then the water content of the concrete has to be accurately controlled to secure the workability. This assumption has not yet been completely established, according to my experience. The water content of the aggregates can be held within slowly varying limits, if the aggregates are suitably stored; say, on a covered, slanting storage area.

[6]Kirkham, **Reinforced Concrete Review**, Vol. II, (1952) p. 599

[7]Garbotz, "Present Status of Knowledge" **Strasse und Autobahnen**, Vol. 4 (1953) p. 17

Mixing (b)

The mixing begins on discharging the materials from the storage bins and ends on discharging from the mixing machine. The mixing procedure has often been investigated. The experiences obtained thereby have been summarized. They have led to proposals for yield and procedure specifications.

The mixing of concretes has received a great deal more attention in the last decade because additives have been included in pavement concrete to produce a limited amount of small pores. A definite mixing time is required. It is necessary to note that pore formation depends also more or less upon the temperature. Accurate amounts of additives must be followed and the mixing time must be kept constant.

Workability Measurements of the Concrete (c)

The uniform consistency of the concrete is obtained by watching the moisture in the aggregate and by accurate water addition when the grading of the aggregates is held in narrow limits. The mixer must be so operated by skilled men as to control the water-cement ratio accurately but also to maintain a constant workability of the concrete by inspection. An apparatus is badly needed to measure the resistance of the concrete to flow and hence its workability. This need has long been appreciated and often stated and is becoming ever more urgent.

Placing and Consolidation of Concrete for the Pavement

After mixing is complete, care must be taken that the properties secured by good mixing are not lost. Even during emptying of the mixer segregation must be avoided. The placing and distribution of the concrete require special care. The concrete should be placed in the greatest density possible and as near level as feasible before the finishers so that the concrete can be uniformly consolidated. It is claimed that the great variance between the compressive strengths of cores bored from the concrete is due to the lack of uniform distribution and consolidation of the concrete. Also the magnitude and the kinds of the variations in the pavement are influenced by the placing.[6]

Our experience shows that for large, heavily traveled roads best results are obtained if the base concrete has the same strength and elasticity as the topping concrete, and that in every case the latter must be freshly applied to the fresh base concrete.

Consolidation of pavement concrete occurs at present almost wholly with vibrating screeds which roll on heavy rails. Internal vibration is also used. For evaluation of the operation of the apparatus, specifications have been set up, according to which, with concrete of a given workability, it can be predicted what degree of consolidation can be expected. Thus the texture, the unit weight and the compressive strength of cores cut from the pavement as well as the flexural strength of slabs can be estimated. By pretesting each piece of finishing apparatus, paving slabs of varying thickness can be finished on different subgrades.

Accordingly we know that pavements up to 8 in. thickness can ordinarily be consolidated with surface vibration.[7] However, a reinforced pavement requires additional attention and foresight.

Only such apparatus should be used which has met a careful evaluation.

The German requirements allow not more than 4 mm. vertical difference in 4 meters lineal length (0.1 percent). This needs checking. The arrangement and strength of the rails carrying the finisher as well as the kind and power for the finisher are factors in securing a plane surface.

Placing the Concrete

Placing the concrete must be done carefully. It is known through experience that dry, warm winds make the work more difficult while great temperature variations between day and night hinder the job, and rainfall has an especially bad action. Therefore, one would think that the concrete should be of only the best quality when placed on the grade.

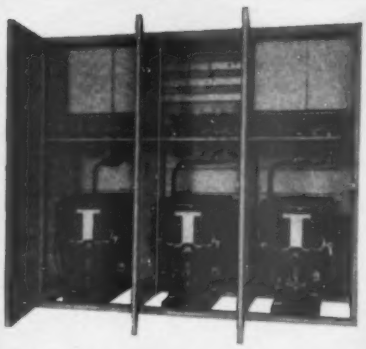
The surface must be in such plane that rain water runs off readily, and concentration of snow melting salts is prevented. Proper preparation of the surface is of utmost importance.

High quality concrete can only be produced at the surface when accumulation of bleeding water, laitance or fine mortar can be prevented on the fresh concrete. If the finished concrete can be given an "after working" at time of initial set, its quality is improved.

If damage to the surface has started, then the extension of the damage through freezing and ponding water,

(Continued on page 114)

"Starting Line-up"



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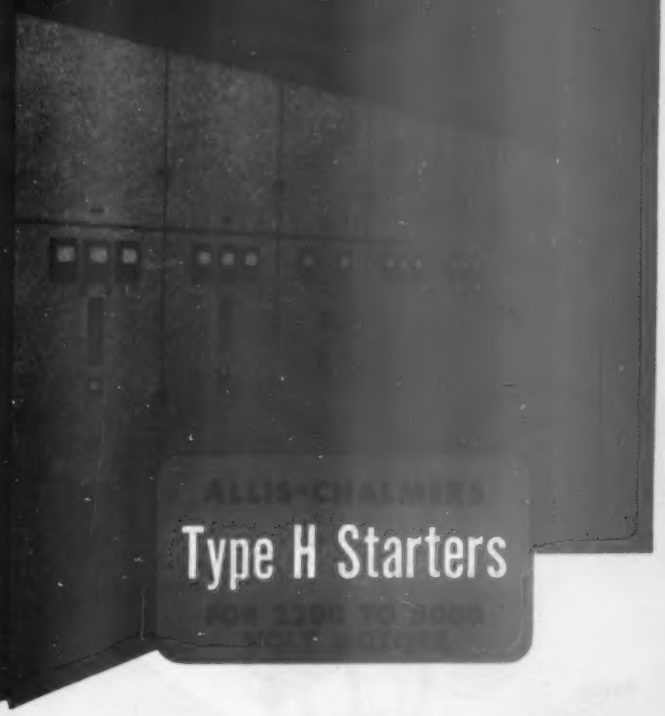

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German Autobahnen

(Continued from page 110)

especially in the presence of salts, proceeds very fast.

Besides these fundamental conditions, many other influences are in operation which cannot always be anticipated. I refer to a significant retrogression in flexural strength in hot weather, as compared to that obtained at 28 days.[4]

Minimum Strength of Paving Concrete

The German specifications ABB, I, C 1, requires 28-day compressive strength to be not less than 5260 p.s.i., and 640 for minimum flexural strength determined on prescribed specimens. The acceptance of pavements is especially regulated. The minimum compressive strength of cores taken from the pavement at two months must reach 4550 p.s.i. This condition is only realized if the whole operation has been suitably organized and carried out.[4]

It remains to be decided whether the flexural strength now required should be checked and whether this required minimum flexural strength, rather than the compressive strength cannot be increased. If that is done it is necessary to take pains that the test specimens should give a true picture of the concrete strength in the pavement. Experience has shown that with the compressive strength, this desire can be fulfilled; but for flexural strength such a relation requires more study.

Pavement Reinforcing

The reinforcement should prevent cracks from opening; that is, it should have a dowel action at the crack. Since the cracks are almost always perpendicular to the length of the pavement, the reinforcing can be laid chiefly longitudinally. This reinforcement should be placed most heavily near the edge, since the cracks start there.

The strength of the reinforcement has often been discussed. Obviously this steel should have a high yield point (Betonstahl IV, with mesh according to DIN 1045). In addition to structural strength a good grip by the concrete is necessary to take up the temperature variations without any overloading. According to present experience a reinforcement of 0.1 percent for 8-in. pavement thickness and slab lengths of about 100 ft. is adequate, where two cut joints are added.

Recently slabs of over 1200 ft. have been built with various reinforcement strengths. Apparently for slabs of about 300 ft. a reinforcing of 0.3 percent for the middle third seem to be adequate.

In the ABB (Autobahn Reports) a joint spacing of 33 to 50 ft. is re-

(Continued on page 118)

[3]Graf, "Eigenschafte des Betons" Springer-Verlag, Berlin 1950, p. 154

[4]Graf, Die Strasse, Vol. 2, p. 52 (1936)

dig this powerful ditcher

PHOTO COURTESY BARBER-GREENE COMPANY AURORA, ILLINOIS

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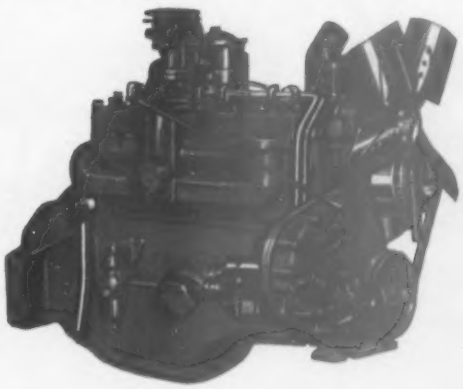

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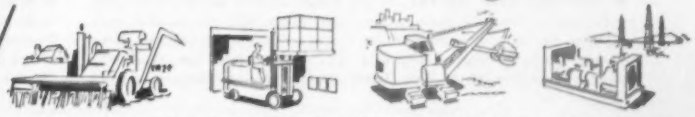

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Pictures of the month . . . *by LeTourneau-Westinghouse* . . .

Eliminates stockpile, plant-mix—"Seeding" sand over quarry rock is the primary job of Monarch Cement Company's D Tournapull, Humboldt, Kansas. Unit self-loads river-deposited material, then spreads controlled layers on limestone bank. Process builds up silica content so that pit shovel loads right mixture for cement-making direct into rail cars. Former expensive stockpiling and plant-mix of silica and rock have been eliminated. Besides "seeding" sand, Tournapull also has time to build levee along nearby Grand River. On this job, D Tournapull regularly self-loads, delivers 68 loads (374 bank yards) per 8-hour day.

9 tons, no spill — This 9-ton rig, one of two belonging to Everett & Clark, Plattsburg, Missouri, hauls 800 yds of shot rock and dirt per 8-hr day from pit to crusher. Material is used to make concete building blocks. Big 7 x 11-ft target and low rear-entry speed shovel-loading of Rear-Dump . . . reduce spillage.

Does work of 2 crawlers — To stockpile coal in Ontario, a large cement co. replaced two 148 hp crawlers with this Tournatractor. 19 mph Tournatractor moves as much coal on 900-ft cycles as both crawlers combined . . . still has time available for such "bonus jobs" as maintaining roads, plowing snow, cleaning pit.

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More cement for Turkey — Stripping a limestone quarry, this D Tournapull self-loaded abrasive, sun-baked clay overburden. Material, hauled 3200 ft down a steep hill, was used as fill for building site and roads. Complete 6400' cycles took 7 min. "D's" simple electric controls allowed an inexperienced Turkish worker to operate machine efficiently after a few hours' training.

Peels wet kaolin — Stockpiled kaolin comes up in sheets when dozed to mill near Macon, Georgia, by Edgar Brothers' Tournatractor. Rig has plenty of traction to move 2½ yd loads, despite slippery, insecure footing. "It really does the work," says James Langford, Supt, "it has plenty of power." Note excellent condition of tires after more than 6000 hours of use.

1 tractor for 150 acres — Wagner Quarry's Tournatractor handles all limestone stripping, stockpiling, odd jobs on their 150 acres. In 18 months (2000 hrs) of year-round work, it has been 98% mechanically efficient. Says W. J. Sprow, Gen Mgr, "It's cheaper, faster to run on rubber than on tracks. Tournatractor replaced 2 crawlers. Its performance is high, maintenance low."

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ROCK BODY CONTRACTORS' BODY ELEVATING TAILGATES

German Autobahnen

(Continued from page 114)

quired. Greater distance between joints is permitted where the climate is mild and where the bases are good. Otherwise a construction joint about every 100 ft. should be employed.

Our present experience shows that slab lengths of about 100 ft. with two cut joints are satisfactory. The question remains, however, whether longer slabs could be recommended. We do know that the requirements for pavements under traffic can only be determined by prolonged investigations, during which the traffic loads, the flexings and length changes of the slab, also the temperature variations and the frictional resistance against slab movement need careful attention. Fine cracks which gradually develop into breaks tend to result from all these factors. The development of cracks with reference to their location, width, length and number serves as a means for evaluation of the suitability of the pavement.

Crack formation also depends upon the curing of the slab, especially over non-uniform bases. Cracks occur along notches much sooner than along densified grooves.

Experiments with reinforcing of different strengths of long slabs show that the laying of very long slabs should occur with trained personnel and with proven equipment. Long slabs should not be built in hot summer, but on days of medium temperature with small temperature differentials.

According to my viewpoint the following are the specifications to choose:

On firm old roads short unreinforced slabs may be built.

New roads taking heavy traffic must be reinforced. A lengthwise reinforcing of about 0.16-0.2 percent is required for slabs from 90 to 125 ft. For slabs of 325 ft. on a sand base, approximately three times as much must be used in the middle third. Cross reinforcing is only required to be strong enough that a mesh is used which is convenient for transport and laying. The reinforcing should be twice as heavy at the edges of the pavement as in the middle, with only 1½ to 2 in. of concrete cover, so that the reinforcing will take up the movements without serious tensile stress.

Cross Section and Thickness of the Pavement

The German Autobahnen have a rectangular section, usually 8½ in. thick. The rectangular section has been chosen because of its convenience in laying. At that time no information was available concerning other section shapes.

The thickness of the slab was chosen on well known formulas which were later checked by actual loading. Apparently axle loads of 8.5 tons have produced no harm.

(Continued on page 121)

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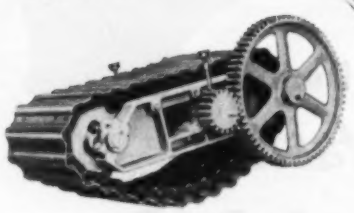
...with REX® Apron Feeders

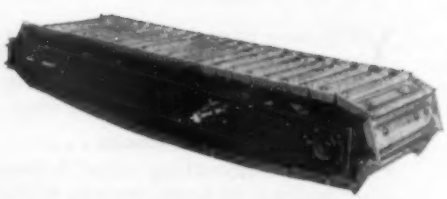
When your conveyors are underfed, you're stepping up costs. You're not getting the capacity you've paid for... subsequent operations cannot be economically controlled!

When your conveyors are overfed, you're wasting money. Following plant operations are economically difficult to balance. And, the wasteful spillage causes unnecessary labor cleanup.

BUT, Rex Apron Feeders, provide the desired, metered rate for all following operations. Rex Apron Feeders are the key units in the close control of plant operations.

Why not have your Chain Belt District Sales Engineer look over your plant with a view to cutting handling costs. Call him or write Chain Belt Company, 4649 W. Greenfield Avenue, Milwaukee 1, Wis.





Typical Handling Operations Where Rex Apron Feeders Can Help Control Processing and Cut Costs

- Coal
- Ores
- Clinker
- Sinter
- Limestone
- Sand
- Cement Rock
- Heavy Chemicals

...and Rex Apron Feeders will handle these materials cold or hot (up to 1900° F.).

Advantages of Rex Apron Feeders

Self-contained...minimum mechanical servicing ...no complicated electrical maintenance.

Sustained efficiency over wide ranges of capacity. Carries material up steep inclines.

Long life. Rex Outboard Roller Construction simplifies maintenance.

CHAIN BELT COMPANY

District Sales Offices and Distributors in all principal cities. Export Offices, 4800 W. Mitchell St., Milwaukee, Wis., and 19 Rector Street, New York, N. Y.

German Autobahnen

(Continued from page 118)

To obtain additional information of suitable cross sections and slab thicknesses, an experimental stretch was laid in 1935.[10] Included were rectangular sections, also with edge thickening, with and without sand base. These slabs have been investigated carefully in 1951.

Slabs with star cross bars had fewer cracks than in their absence. However, the construction in layers is costly and the benefit of the bars is apparently limited. In my opinion it is better to stabilize the base with bitumins.

The 8.5 in. thick slabs have given very good service.

However, the permissible loading has been increased and the traffic is much heavier so that the loading of the pavements is appreciably heavier than a few years ago. Therefore, one is inclined to increase the carrying capacity of future pavements where the traffic is heavy.

Behavior of Concrete Pavements

Destruction of our concrete pavements by freezing and thawing has only occurred occasionally. Thin exfoliation of the surface layer has been, however, repeatedly observed. Those pavements which were not salted to melt snow are in good condition if laid according to specifications. It should be remembered that the concrete at the surface where traffic rolls requires most careful laying. After working of the surface at a suitable time has probably contributed improvements in this regard.

Beside that, we know that concrete containing a limited amount of entrained air possesses an appreciable increase in resistance to freezing and thawing.

This increase in concrete durability through air entraining agents is more significant where salts are used.[11]

Old concrete has experienced considerable exfoliation where salts were repeatedly used, requiring much greater maintenance. Such losses were much smaller with air entrainment of 2½ to 3 percent. The durability of the concrete was increased in this way but cannot be regarded as everlasting. Additional improvements are to be expected through analysis of the mechanism of the attack by the different salts and through clarification of possible precautions. It would be desirable to have salts which do not chemically and physically attack the concrete while having a good melting action. We should have admixtures which prevent the salts from attacking the concrete.

[10]**Graf and Weil, "Forschungsarbeiten aus dein Strassenwesen," Volk und Reich,** Vol. 13, Berlin 1939

[11]**Strasse un Autobahn,** Vol. 1 (1950) p. 36

[12]**"Jahrbuch 1936 der Forscherngsgesellschaft fur das Strassen wesen" Berlin 1936, p. 145.** On p. 158 it is stated that one in. dowels carry about 2200 lb. over ½-in. joints.

[13]**Walz, Beobachtung an Fahrbahndecken,** 1952, p. 12

Saves $14,000 per year

How Woodall Industries Uses Pangborn to Reclaim Wood Dust for Fuel

Mass production of made-to-order Masonite parts means mass production of dust and fine shavings as hundreds of parts per hour are sawed, punched, sanded, molded, drilled and shaped from sheets of Masonite. But Woodall Industries, Inc. put this scrap to work in its Mineola, L. I. plant with the help of a Pangborn dust collection system.

All this dust generated in processing is collected, transported to bins and then burned as fuel — providing all the fuel for both heat and processing requirements. In just one year, Woodall estimates that the savings amounted to over $14,000 in fuel alone —plus additional savings in plant maintenance costs. Employee health and morale, too, gain from this Pangborn-planned program of dust control.

Pangborn Corp., 4300 Pangborn Blvd., Hagerstown, Md.

How Much Can Pangborn Dust Control Save You?

Pangborn engineers are ready to discuss *your* Dust Control problems — large or small, and show you how Pangborn equipment can save you time, trouble and money. Write your name and company address on the margin of this ad and mail in today for a no-obligation discussion.

Pangborn DUST CONTROL

STOPS THE DUST HOG FROM STEALING PROFITS

PANGBORN'S 50TH ANNIVERSARY • 1904-1954

Cuts

Stuffing Box Maintenance...

Fluctuating Sealing Water Pressure Is No Problem when you install a Morris Type R Slurry Pump. Even when peak demand on the plant supply line lowers the pressure, this pump operates with minimum stuffing box wear. Only 10% normal sealing water pressure is actually required . . . because Morris Type R stuffing box is subject to *suction pressures only*. Low line pressure is therefore sufficient to shut out grit effectively . . . and still protect the slurry from objectionable dilution.

If no other Type R feature were listed, here's one that says: Specify Morris. But there's even a bigger story. Ask for further information on this outstanding slurry pump, servicing scores of material handling applications.

OTHER MORRIS TYPE R FEATURES

✔ EASY TO INSTALL ✔ EASY TO DISMANTLE
✔ EASY TO MAINTAIN ✔ SIMPLEST DESIGN
✔ MINIMUM NUMBER OF WEARING PARTS

Specify **MORRIS Type "R" SLURRY PUMP**

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS *Centrifugal Pumps*

Lime Chart

(Continued from page 90)

In the particular case under study, for part of the time the kiln efficiency was poor and for the remainder of the time it was fair or good. The lowest equivalent CO_2 was 32 percent or 6.8 million B.t.u. per ton, and the very best was 3.5 million, which was exceptional if the analysis was right.

The average was 5.25 million which could be considered fair, but the group shows that 4.5 million could have been expected if the worse operating points had been eliminated.

From the study of the remaining data obtained in correlation with the chart results, one should be able to decide what to do to eliminate the extreme variability and to bring up the average.

The present article, one of the "kiln efficiency" series, establishes kiln thermal requirements by means of gas analysis. The chart is for high calcium lime, a separate chart is required for dolomitic lime. This separate chart is necessary because magnesite releases a larger amount of CO_2 gas than calcite.

The gas analysis data obtained for the purpose of evaluation by means of this chart has other valuable uses, which will be developed in the subsequent issues for the "efficiency" series. Suitably interpreted, it would reveal excess air, incomplete combustion and heat losses attendant thereon from which the stack loss would be arrived at. There are other varied approaches, and from a combination of them, a fairly good kiln heat balance could be arrived at, something which every lime plant operator should know. These simplified approaches would not give an entirely precise balance, but to have a partial knowledge is better than none at all as it is quite ordinarily the case today. Even in plants where several thousand dollars worth of fuel may be burned in a day, there is little knowledge of what was usefully applied and what was wasted, and particularly little of the direction and reasons for the waste.

Canadian Asbestos Plant

CASSIAR ASBESTOS CORP., LTD., which for over a year has operated a temporary plant at its asbestos mining site near Lower Port, B. C., has announced plans to build a permanent plant to handle 500 tons of asbestos ore daily. Exploration of British Columbia's "asbestos mountain," 70 miles south of the Yukon border, reportedly revealed the deposits to contain enough ore to supply a 500-ton plant for 40 years.

Change Name

ANNOUNCEMENT was recently made that Coogan Gravel Co., formerly owned by the late Paul M. Coogan, is now operating as follows: Estate of Paul M. Coogan, D/B/A Coogan Gravel Co.; James M. Coogan and Elizabeth S. Coogan, executors.

New Lucky Peak Dam Gets Concrete Aggregate Screened with SECO'S

Photographed on the job—Boise, Idaho

Quinn Robbins Co. Inc. Chooses SECO to Meet Army Engineers Specifications

Fifty thousand cubic yards of aggregate in four sizes—screened under the toughest conditions to rigid Corps of Engineers specification! That was Quinn-Robbins' job on the Lucky Peak Dam at Boise. They picked SECO screens, four of them, to do the job, and delivered one hundred percent!

Using a jaw crusher, a roll crusher, two sand screws, and four SECO screens, Quinn-Robbins washed and graded in one continuous operation—produced 600 cubic yards of 3", 1½", ¾" and sand every 7½ hours—a rate of 120 tons an hour! Quinn-Robbins relied on SECO screens to do the job right and on time, and fulfilled a tough contract.

How about your next contract? SECO MAKES A SCREEN TO FIT EVERY REQUIREMENT, TO STAND UP TO THE BIGGEST JOBS AND DELIVER HOUR AFTER HOUR, DAY AFTER DAY, TROUBLE-FREE OPERATION.

Send for FREE Catalog No. 203 today!

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

SEE YOUR NEAREST SECO DISTRIBUTOR FOR "BETTER SCREENING"

Let Seco screening experts recommend the right screen or screens for your job. Over 350 models in single, double, triple and three and one-half deck construction.

SCREEN EQUIPMENT CO., INC.

BUFFALO 25, NEW YORK

To producers of sand and gravel, rare earths, and other mineral products

Combine digging and

made-to-order processing plant

aboard a YUBA dredge

This Yuba dredge (4000-ton displacement) digs 112 ft. below water with 18 cu. ft. buckets; has ample deck space for processing machinery.

Dredging costs under 5¢ per ton for gravel are not uncommon with large YUBA bucket ladder dredges. They also have dug cemented gravel, boulders, and into bedrock without costly drilling and blasting. They float in their own ponds, excavate without lowering surrounding water levels. Bucket sizes range from 2½ to 18 cu. ft. . . . digging depths from 10 ft. or less to 125 ft. below water.

Complete Plant Afloat

Your YUBA dredge can be built to screen out rocks; to break up and wash away surplus clay; to size through single or multiple screens; to remove mineral products by jigs, cones or magnetic separators. In short, you can completely process and grade your product as you dig, all aboard a YUBA dredge.

Choice of Handling Methods

Your dredge can be designed to stockpile ashore, load into trucks or shore conveyor; load into barges; or pump ashore through pipes.

Consult YUBA NOW. We can build you a new dredge . . . redesign, move and rebuild a used dredge . . . to fit your particular needs. Wire, write or call us — no obligation of course.

67

YUBA DREDGES

YUBA MANUFACTURING CO.

Room 717, 351 California St., San Francisco 4, California, U. S. A.

AGENTS { SIME, DARBY & CO., LTD. · SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DARBY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E. C. 3.

CABLES: YUBAMAN, SAN FRANCISCO · SHAWDARBCO, LONDON

Calaveras Improvements

(Continued from page 72)

95 t.p.h. per unit. The older mills, which are the overflow type with grates on the discharge end, have no lifters. However, the new 9- x 9-ft. Marcy preliminator mill has lifters and hence has a low pulp line. It is loaded with 30 tons of grinding media with 4-in. being the top size and 1½-in. the bottom. Make-up balls are 4-in. The installation and changeover work started near the end of 1951, and was completed in October of 1952. The large Marcy mills with liners, but without the ball load, weigh 138 ½ tons.

In the San Francisco office, the staff includes: William Wallace Mein, Jr., president; Mel J. London, vice-president and general sales manager; E. M. Barker, vice-president; and Lewis A. Parsons, consulting engineer. At the plant Grant W. Metzger is plant manager; Marion Heard, assistant plant manager; and Mel C. Sutton, chief chemist.

Salesmen's Guide Book

DRAVO CORP., Pittsburgh, Penn., to facilitate and make salesmen's visits to the company's buying offices more effective, has published a guidance booklet entitled "Facts and Faces of Interest to You in the Dravo Purchasing Department." The booklet contains a concise outline of the work done and jobs undertaken by the major divisions of Dravo, including the Contracting, Engineering Works, Keystone and the Machinery Divisions. Subsidiaries of the company, including Dravo-Doyle Co., Union Barge Line Corp., and Charleroi Supply Co., each has its own independent purchasing department.

The booklet makes it easy for a salesman to see the right buyer for the product he sells, with a minimum of waste-time for both seller and buyer. Pictures of the purchasing agents and buyers, along with short paragraphs outlining the type of material in which each buyer is basically interested, are included.

Asbestos-Cement Siding

ASBESTOS-CEMENT siding shingles have moved into a top position among home-building materials, as recently reported by Chester C. Kelsey, manager, Asbestos-Cement Products Association. Shipments of asbestos-cement siding in 1952 were the highest on record, exceeding by 7 percent the previous high reached during the record home-building year of 1950. Production for the first half of 1953 was at approximately the same rate as for 1952.

A recent survey of frame houses built in 1950 reportedly showed that 24 percent, or about one out of four, had asbestos-cement siding. In a similar survey made ten years previously, asbestos-cement siding was used on only one out of 25 homes.

NEW CHEVROLET TRUCKS

do more work per *day* . . . more work per *dollar* on every type of hauling or delivery job!

Time and money are the two most important factors in any trucking job—and the new Chevrolet trucks for '54 are built to save more of *both!*

THEY SAVE YOU TIME ALL THE TIME

Whether you deliver door-to-door or haul state-to-state, new Chevrolet trucks will speed up your schedules. They bring you new hour-saving engine power—greatly increased acceleration and hill-climbing ability. You save time with greater safety . . . and *without* increasing your maximum road speeds. In traffic or on delivery routes, new truck Hydra-Matic transmission* saves time, and saves driving effort as well. It's the last word in no-shift truck driving.

THEY SAVE YOU MONEY IN *EVERY* WAY

Along with increased power, these great new trucks bring you increased operating economy. You enjoy hefty gasoline savings in every model, thanks to new high-compression performance. In addition, you save on upkeep and maintenance. That's because you get extra strength and stamina in drive line and chassis. There are heavier axle shafts in 2-ton models, newly designed clutches and stronger frames in all models.

See your Chevrolet dealer for all the facts about the "savingest" Chevrolet Advance-Design trucks ever built! . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

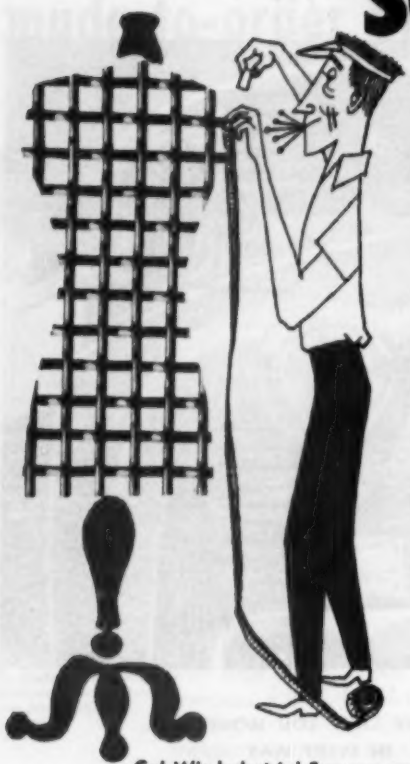
MOST TRUSTWORTHY TRUCKS ON ANY JOB! CHEVROLET

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates backrubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cab models, "Jobmaster 261" engine on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

CAL-WIC INDUSTRIAL SCREENS...



tailored to fit your specific needs

Cal-Wic Industrial Screens are manufactured in ferrous and non-ferrous metals to meet individual requirements and are woven to the most exacting tolerances to fit any specification.

We will be happy to help you pick the *right* CAL-WIC screen for your particular operation. For complete information on CAL-WIC Industrial Screens, write to the office nearest you.

Other CF&I Products for the Sand and Gravel Industry

Wickwire Rope Grinding Balls

Grinding Rods Light Rails and Accessories

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—New York

1936

CAL-WIC
INDUSTRIAL SCREENS CF&I
THE COLORADO FUEL AND IRON CORPORATION

Labor Relations Trends

(Continued from page 57)

bership in the respondent union" and because, assuming the effect of the discrimination on other employes was relevant, the court found no evidence to support a conclusion that such employes were so encouraged or discouraged. The U. S. Supreme Court granted the Board's petition for certiorari.

Extracts From Supreme Court Decision

"The language employed by Congress in enacting the heart of paragraph 8(a)(3) is identical with that of the predecessor section in the Wagner Act, paragraph 8(3): 'By discrimination in regard to hire or tenure of employment or any term or condition of employment to encourage or discourage membership in any labor organization . . .' These are the first cases to reach us involving application of this section or its predecessor to the problem of encouragement of union membership by employers. We have on many occasions considered aspects of the application of these sections to actions by employers aimed at discouragement of union membership. The principles invoked in those cases are, of course, equally applicable to both aspects of employer discrimination, but most of the issues of statutory construction raised here have not previously been considered by this Court.

"In past cases we have been called upon to clarify the terms 'discrimination' and 'membership in any labor organization.' Discrimination is not contested in these cases: involuntary reduction of seniority, refusal to hire for an available job, and disparate wage treatment are clearly discriminatory. But the scope of the phrase 'membership in a labor organization' is in issue here. Subject to limitations, we have held that phrase to include discrimination to discourage participation in union activities as well as to discourage adhesion to union membership.

"Similar principles govern the interpretation of union membership where encouragement is alleged. The policy of the Act is to insulate employes' jobs from their organizational rights. Thus paragraph 8(a)(3) and 8(b)(2) were designed to allow employes to freely exercise their right to join unions, be good, bad, or indifferent members, or abstain from joining any union without imperiling their livlihood. The only limitation Congress has chosen to impose on this right is specified in the proviso to paragraph 8(a)(3), which authorizes employers to enter into certain union security contracts, but prohibits its discharge under such contracts if membership 'was not available to the employe on the same terms and conditions generally applicable to other members' or if 'membership was denied or terminated for reasons other

Jaeger 365 has the "plus" air needed

Drilling 24" wick holes in blue muck

To drain and stabilize river bottom blue muck bordering Highway 51, the Leon B. Stilley Construction Co., of Marion, Ill., used a 24" auger to drill wick holes 25' deep, spaced 25' apart. (This was only the second time that sand wicks have been used in Illinois.)

To pull this auger in the sticky muck required a 15 hp air motor using 330 cfm of air @ 100 psi—too big a job for any "old standard" 315 compressor, but a natural for a Jaeger 365.

Jaeger, and Jaeger alone, is completely engineered throughout all ratings—600, 365, 250, 185, 125 and 75 cfm—to match the air demands of modern tools. For example: Jaeger-engineered valves are 75% to 100% larger for free air flow and up to 10 times longer valve life. Valve seats and discs are machined on both faces simultaneously to parallel planes within 7/1,000,000 of absolute flatness. This exclusive method eliminates the distortions which "spring back" into valve discs under ordinary face grinding. You get positive leak-proof closure.

Ask your Jaeger distributor to show you the "plus" features of a Jaeger—its pressure lubricated, W-type compressor unit, its larger intercooler, air receiver, clutch and engine. They enable a Jaeger to deliver 15% to 25% more air than others at the lowest known cost per cubic foot. For full details, ask for Catalog JC-1.

THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio

TRACTOR LOADERS • PUMPS • CONCRETE MIXERS • TRUCK MIXERS • PAVING MACHINES

MODERNIZE YOUR PLANT with Cedarapids-Schrock MOTORIZED HEAD PULLEYS

Here's a plant *modernized* with Motorized Head Pulleys that cut conveyor downtime up to 90% because all moving parts are inside the pulley shell! You save labor, too. On the installation shown at the left, the control switch enables the truck driver to pull up and load his own truck simply by pressing the button.

HUNDREDS OF INDUSTRIES ARE REDUCING CONVEYOR DOWNTIME 70% to 90%

• NOW you can eliminate maintenance headaches on your belt or belt-bucket conveyor installations. With Cedarapids-Schrock Motorized Head Pulleys there are no chains, sprockets, sheaves out in the weather and dirt, no chain idlers to keep adjusted and oiled, no V-belts to adjust or replace, no shafts and drives to service or lubricate. *There is no other pulley like it!*

The next time you're down for weather, between jobs, or shut down for any reason, provide for future cuts in maintenance costs by modernizing your plant with *Motorized* Head Pulleys. Your Cedarapids distributor can give you the money-saving details.

Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by

YUBA MANUFACTURING CO. (Pulley and Sprocket Dept.) **Benicia, California**

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U.S.A.

for Free-flowing Bins, Hoppers and Chutes

install SYNTRON

ELECTRIC VIBRATORS

Assure a positive flow of fine powders or hard-to-handle lumps on bulk handling jobs where speed and economy are important. 3600 electromagnetic vibrations per minute eliminate arching, plugging and clogging. Compact—easy to install—low operating cost.

Write today for complete catalog data — Free

SYNTRON COMPANY
450 Lexington Avenue — Homer City, Penna.

than the failure of the employe to tender periodic dues and initiation fees uniformly required as a condition of acquiring or retaining membership. Lengthy legislative debate preceded the 1947 amendment to the Act which thus limited permissible employer discrimination. This legislative history clearly indicates that Congress intended to prevent utilization of union security agreements for any purpose other than to compel payment of union dues and fees. Thus Congress recognized the validity of unions' concern about 'free riders,' i.e., employes who receive the benefits of union representation but are unwilling to contribute their share of financial support to such union, and gave unions the power to contract to meet that problem while withholding from unions the power to cause the discharge of employes for any other reason. Thus an employer can discharge an employe for nonmembership in a union if the employer has entered a union security contract valid under the Act with such union, and if the other requirements of the proviso are met. No other discrimination aimed at encouraging employes to join, retain membership, or stay in good standing in a union is condoned.

From the foregoing it is clear that the Eighth Circuit too restrictively interpreted the term 'membership' in the Teamsters union and this driver was discriminated against by his employer because he was delinquent in a union obligation. Thus he was denied employment to which he was otherwise entitled for no reason other than his tardy payment of union dues. The union caused this discrimination by applying a rule apparently aimed at encouraging prompt payment of dues. The union's action was not sanctioned by a valid union security contract, and, in any event, the union did not choose to terminate the driver's membership for his delinquency. Thus the union by requesting such discrimination, and the employer by submitting to such an illegal request, deprived this driver of the right guaranteed by the act to join in or abstain from union activities without thereby affecting his job.

* * *

"The language of paragraph 8(a)(3) is not ambiguous. The unfair labor practice is for an employer to encourage or discourage membership by means of discrimination. Thus this section does not outlaw all encouragement or discouragement of membership in labor organization; only such as is accomplished by discrimination is prohibited. Nor does this section outlaw discrimination in employment as such; only such discrimination as encourages or discourages membership in a labor organization is proscribed."

* * *

"In this case the employer discriminated upon the instigation of the union. The purposes of the union in causing such discrimination clearly

WHAT FULL CONTROL MEANS

to the operator of an Allis-Chalmers TR-200 Motor Wagon

Fast, Efficient Loading — hydraulic steering control gets the TR-200 under the shovel fast without tiring wheel fight. Large top area permits fast loading with less spillage . . . double steel floor is reinforced with heavy oak plank to absorb loading shocks. Steering jacks and tires are fully protected from falling rock. The TR-200 carries 15 cu. yd. heaped or 18-ton loads.

Quick, Clean Dumping — operator controls two hydraulic jacks to dump and return bowl. Because this unit's wheelbase remains stationary, all four brakes can be set for maximum safety in bank-edge dumping. Rear end dumps far enough over embankment to eliminate rehandling material. Tapered bowl design and 76-degree tilt give quick, complete load ejection. Body may be heated to prevent load freezing

Safe, High-Production Hauling — no worry when highballing a full load because four-wheel air brakes stop the TR-200 quickly even if the engine should stall. Steering pistons are equipped with stops to eliminate jackknifing. High horsepower-to-yardage ratio and large, rock-lug tires speed your operations . . . even on steep grades and in heavy going. The TR-200 travels at speeds up to 21.6 mph., delivers more loads, reduces idle shovel time.

Plus Added Versatility — The same 176-hp. diesel tractor unit and hydraulic controls may be used to operate an interchangeable self-loading scraper body for large scale stripping and hauling jobs.

GET THE FULL STORY FROM YOUR ALLIS-CHALMERS DEALER

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, WIS.

CAN YOU WELD MANGANESE...
with your eyes shut?
YOU CAN – If you use...
MANGANAL
U.S. Patents 1,876,730—1,947,167—2,621,995
FLO-KOTE
11%-13½% MANGANESE-NICKEL STEEL
AC-DC WELDING ELECTRODES
Gives you all the advantages of tough, ductile Manganese-Nickel Steel weld deposits yet runs as easily as stainless or mild steel electrodes.
Not a composite rod.
Alloys in rod, not coating.
Contains Nickel, not substitutes.
Write for literature.
STULZ-SICKLES CO.
SOLE PRODUCERS 92 N. J. RAILROAD AVE. NEWARK, N. J.
NEAREST DISTRIBUTOR UPON REQUEST

THIS PUMP HAS
A Conscience!
It will guard your investment with its life. Outlasting ordinary pumps many times, NAGLE PUMPS are designed and constructed to withstand abusive service, such as pumping highly abrasive mixtures, corrosive liquids, hot solutions or heavy slurries. Horizontal and vertical shaft types in complete range of sizes.
Type "SW-O" shown, is directly submerged in material to be pumped. Free of packing and bearing troubles. Rendering outstanding service in important processing plants, mines and mills. Get the facts—ask for Bulletin SWO.
NAGLE PUMPS
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PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

were to encourage members to perform obligations or supposed obligations of membership. Obviously, the union would not have invoked such a sanction had it not considered this an effective method of coercing compliance with union obligations or practices. This truck driver was denied jobs by his employer solely because of the union's actions. Since encouragement of union membership is obviously a natural and foreseeable consequence of any employer discrimination at the request of a union, this employer must be presumed to have intended such encouragement. It follows that it was eminently reasonable for the Board to infer encouragement of union membership, and the Eighth Circuit erred in holding encouragement not proved."

In accordance with this ruling the decision of the Eighth Circuit Court of Appeals was reversed and the ruling of the N.L.R.B. upheld—a very definite Teamsters' union defeat.

Rocky's Notes

(Continued from page 55)

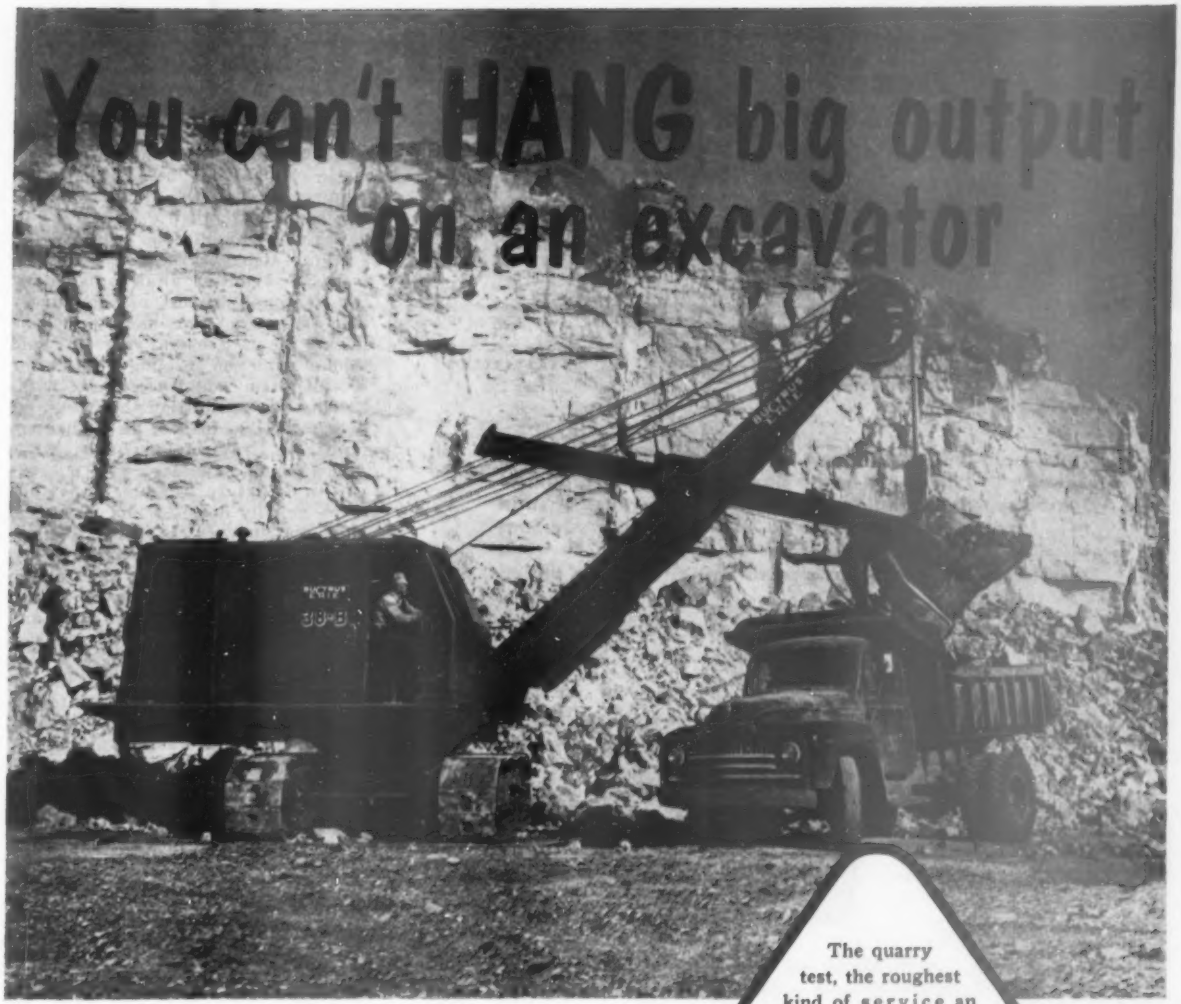
trainment are not confined solely to those which make concrete resistant to freezing and thawing or to wetting and drying. The process by which these air-entrained pockets remove water from the gel may be highly desirable for consolidating or solidifying the gel. Readers have seen from these discussions in previous issues that if water or (OH) ions are removed from the silica ions or the silica particles they enclose, the ions or particles of silica tend to join up to form a continuous lattice (relatively large crystals) instead of an infinite number of small integral lattices connected with one another by weak bonds, such as we seem to have had demonstrated in this paper under discussion. In other words, in our humble opinion, the authors of this paper have opened up a prospect much larger than the exploration of the phenomenon involved in freezing and thawing.

To Issue Cement Stock

MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., recently registered a 100,000-share issue of common stock with the Securities and Exchange Commission. An underwriting group, headed by A. G. Becker & Co., Inc., will offer the stock to the public at a price to be named later. Proceeds from the stock issue reportedly have been used by Marquette for the purchase of two cement plants, in Georgia and in Ohio.

New Zealand Perlite

DEPOSITS OF PERLITE have been discovered in New Zealand in quantities sufficient to warrant commercial exploitation, as recently reported in *Engineering and Mining Journal*. The discovery is said to have prompted increased interest in the hitherto inadequately examined New Zealand mineral potential.



The quarry test, the roughest kind of service an excavator can get, proves Bucyrus-Erie quality. See your Bucyrus-Erie distributor for the complete story on *individual design.*

BUCYRUS ERIE

To get the most work out of your excavator, every piece of machinery from treads to boom point sheaves must carry a proper share of the load. When any part is underworked or overworked, decreased performance results.

If you try to increase output by attaching a bigger dipper and more counterweight, the engine is going to sweat and strain under the load. Leaving dipper capacity as is and increasing horsepower with a bigger engine won't help either because shafts, drums, clutches and brakes will wear out quickly and fail.

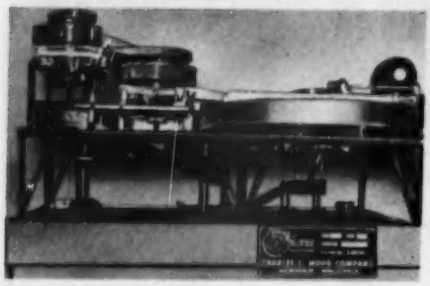
Big output must be built into your machine at the start. That's why Bucyrus-Erie individual design counts so much. Power, speed, strength and weight are exactly proportioned for peak efficiency in a specific work range. There's top performance right down the line — fast smooth cycle, simple and easy operation, low fuel consumption, exceptional savings on maintenance and wear. 44E53

BUCYRUS-ERIE CO.

South Milwaukee
Wisconsin

¾- to 4-yd. gasoline, diesel and single motor electric convertible excavators.

We Laid the ACTUAL PRODUCTS on the TABLE at the NSGA Show...



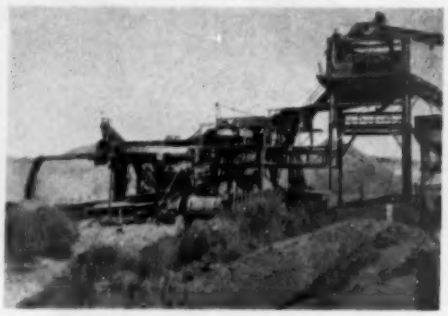
Patented; other Pats. Pend.

with these WORKING MODELS of

AUTO-VORTEX CLASSIFIERS

Yes, right before your eyes a scale model AUTO-VORTEX Plant . . . two Cones and a Bowl . . . actually produced three separate products . . . three distinct grades of sand . . . from a feed of minus 3/16" to minus 200 mesh! Similar full size plants are successfully producing the same sharp splits under varying conditions all over the United States.

For example, this plant in North Dakota, almost a duplicate of our test model, has effectively eliminated the bulge of middle size sand and recovered the specified percentage of minus 200 mesh. It has delivered over 200,000 yards of Corps of Engineer specification material without rejection.



While your conditions may not exactly parallel these, AUTO-VORTEX CLASSIFIERS have proved their adaptability to requirements that range from a simple, single classification plant to more complicated systems for handling large or small tonnage. Whatever your problem, perhaps you'll find your answer in our brochure on Cone and Bowl type AUTO-VORTEX CLASSIFIERS. Why not write today!

CHARLES E. WOOD COMPANY
906 NORTH WATER ST. • MILWAUKEE 2, WISCONSIN

ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

Pennsylvania Meetings

(Continued from page 91)

C. H. Buckius, chief engineer of the Pennsylvania Department of Highways, gave a brief talk on the 1954 highway maintenance and construction program, and submitted a photostatic copy of the detailed material requirements of the Department by counties.

Carlyle Gray, director of the Pennsylvania Geological Survey, Department of Internal affairs, explained the principal purpose of the Survey and the work that had been done during the past several years. He said that a reduction in budget funds for the biennium would necessitate withholding for publication the results of field work due to lack of publication funds. Mr. Gray pointed out that while Pennsylvania is blessed with a great wealth of natural resources, they are being rapidly depleted and geological research surveys are not keeping abreast with the requirements.

John D. Paul, chief construction engineer of the Pennsylvania Turnpike Commission told about plans and location for the north-south extension from the Philadelphia area to the New York state line.

George Rahn, Jr., chief materials engineer, of the Turnpike Commission, said that it was not planned to make any material changes in the coarse and fine aggregate specifications for this new extension.

Messrs. Harry G. Banzhoff, Jr., and Irvin Graybill, attorneys representing the Pennsylvania Department of Revenue on the one percent sales tax, conducted a question and answer program on the application of the tax. Most of the discussion centered around, "when a stone producer delivered material to the state and dumped it on a stockpile, and when he delivered it to the same kind of a project and spread it through his truck tailgate on the graded roadway instead of the berm of the road." In the latter case, it was argued that the stone producer was more than just a material supplier; he was in fact, a contractor, and therefore the one percent sales tax applied. It was finally decided that these were borderline cases, and required further study.

Opens Research Center

NATIONAL GYPSUM CO., Buffalo, N.Y., recently opened its new $1,000,000 research center at Tonawanda, N.Y. The center's staff of nearly 100 research workers includes key personnel from the company's seven research laboratories in Clarence Center, N.Y.; New Orleans, La.; Trenton, N. J.; Bellefonte, Penn.; Mobile, Ala.; Niles, Ohio; and Alexandria, Ind. These research laboratories are being combined at the new center to "permit a free interchange of information and enable them to contribute to each other," according to a company official. The center is headed by Research Director William H. Harding.

QUARRY OWNER HITS 1,273 TONS DAILY OUTPUT WITH HIGH-SPEED SCHIELD Bantam® METHOD

W. B. Mount, Maymead Lime Co., Shouns, Tenn., AVERAGED 127 CU. YDS. HOURLY in one 9 hour day . . . AVERAGED 1,273.04 TONS daily in a 9-day operation, loading out stockpiled crusher run stone! According to Mount, this remarkable production record was achieved the FIRST time they had enough trucks to keep up with the BANTAM! Here is the daily record:

1st Day	— 1146.27	Tons
2nd "	— 1142.00	"
3rd "	— 1186.11	"
4th "	— 1234.00	"
5th "	— 1392.00	"
6th "	— 1467.00	"
7th "	— 1436.00	"
8th "	— 1346.00	"
9th "	— 1108.00	"
TOTAL	11,457.38!	

OWNER PLEASED WITH PERFORMANCE

"Needless to say," commented owner Mount, "we are very much pleased with this piece of equipment in handling our agricultural lime and construction stones!"

You, too, can realize tremendous production boosts and savings in equipment and manpower costs with the low cost BANTAM method! BANTAMS cost you less to buy . . . less to own and operate, and get the tough jobs done faster!

NOW is the time to see a BANTAM in action ON YOUR JOB! A free demonstration can easily be arranged WITHOUT OBLIGATION! See for yourself how the BANTAM feeds crushers and ready-mix batching plants . . . how the BANTAM Truck-Crane with its big 12,000 lb. lifts can replace your older gin-pole methods for faster handling of cut stone . . . how the BANTAM keeps up with a constant stream of trucks in your pit!

BANTAM'S NEW CRAWLER . . . with low ground bearing pressure, brings added efficiency to the sand and gravel pit. Full Circle swing makes it easy to load out of tight spots or to trucks on either side of rig! Independent, 2-speed travel makes easy work of side-bank digging . . . Automatic dipper trip (optional) cuts time between bites to a minimum!

YOU CAN'T AFFORD NOT TO OWN A BANTAM

It makes good dollar sense! Low initial cost . . . low operating cost . . . low upkeep and repair . . . that's the economy of owning a BANTAM! All this PLUS high production and many time and labor saving features normally found only on larger, more expensive rigs, adds up to profitable operation in any man's language. There's a BANTAM mounting, too, that will fit your needs EXACTLY! BANTAMS mount on Crawlers . . . Crane Carriers . . . Remanufactured trucks or on your own truck! See for yourself! Ask for a free demonstration *on your job* . . . ask for free literature on the BANTAM Shovel-Crane Line . . . DO IT TODAY!

SB — TMSH — 1

SCHIELD Bantam

COMPANY • 216 PARK ST., WAVERLY, IOWA, U.S.A.

WORLD'S LARGEST PRODUCERS OF TRUCK-CRANES AND EXCAVATORS

Pays for itself...

ON YOUR BOOM MACHINE

SAUERMAN SCRAPER

When you add a Sauerman Crescent Scraper to your boom machine as auxiliary equipment, you are making a profitable investment which will repay many times its moderate initial cost. This unique bottomless bucket will, in many cases, handle a load of up to 50% greater capacity than its regular bucket or clamshell.

On short range work, such as backfilling, grading and similar jobs, the Crescent is simply cast from the boom tip like the regular bucket. The Crescent bites into the earth wherever it strikes and fills to capacity on the forward pull. The load literally floats along the ground to the discharge point and is deposited when the scraper is raised by the boom line.

When a job calls for digging from a river, deep pit or soft area beyond the reach of the boom, the Crescent Scraper is suspended by chains from a simple trolley that rides on a track cable extending from the boom tip to an anchorage. One drum of the machine raises and lowers this track cable, while the other drum operates the inhaul cable attached to the front of the scraper. Digging, hauling and discharge proceed as in the casting operation. Following discharge the empty scraper is lifted and gravity-returned to the excavation point.

Above: A 1½-cu. yd. Sauerman Crescent used with a 1-cu. yd. dragline is lifted clear of the levee and returns to the borrow pit by gravity at 1500 fpm.

Above: Boom machine has a boom length of 110 feet and uses a 4-cu. yd. Crescent scraper, replacing a 2½-cu. yd. dragline bucket.

Write for Field Report 219, Scrapers with Boom Machines and Catalog J, Scraper Buckets

SAUERMAN BROS., INC. 530 S. Clinton St. Chicago 7, Ill.

SAUERMAN BROS., Inc.

MANUFACTURERS NEWS

Athey Products Corp., Chicago, Ill., announces that W. D. Lease, formerly in charge of research and development, has been appointed manager of sales promotion. A. R. Langton continues as export sales manager, A. T. Marchuk as domestic sales manager, and E. L. Peterson as advertising manager. Mr. Lease received his B.S. degree from Armour Institute in 1943 before entering the United States Navy. He returned to Armour Institute at the close of the war, and after obtaining his degree in mechanical engineering, he joined Athey Products Corp. as works engineer. He was appointed district representative in the central and mid-western states and subsequently became manager of research and development.

W. D. Lease

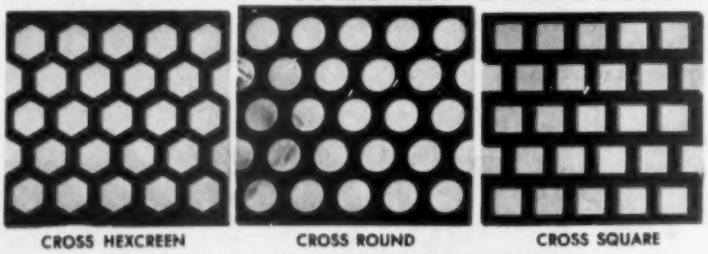
Sintering Machinery Corp., Netcong, N. J., announces formation of a new division, Dwight-Lloyd, Inc., for the design, construction and sales of lightweight aggregate sintering plants and related process equipment. The new division takes its name from the inventors of the sintering process and founders of Sintering Machinery Corp.

Tool Steel Gear & Pinion Co., Cincinnati, Ohio, announces that Clarence R. Burrell, vice-president in charge of sales, has been appointed director of the General Components Division, Business and Defense Services Administration, Department of Commerce, Washington, D. C.

The Osgood Co., Marion, Ohio, announces that the third step in its reorganization program is the purchase of all capital stock of The General Excavator Co., Marion, Ohio. This consolidation began in October, 1950, when The Osgood Co. and The General Excavator Co. sales divisions were combined under the name Os-

"CROSS" PERFORATED STEEL SCREENS

A HONEY OF A SCREEN . . . RELIABLE PERFORMANCE



CROSS HEXCREEN CROSS ROUND CROSS SQUARE

SERVICES OF "CROSS" FIELD ENGINEER AND TECHNICAL DATA ON REQUEST

Segments, Sections, Decks and Parts for VIBRATING SHAKING REVOLVING and Other TYPES OF MACHINERY

Look for this Stamp on all "Cross" Products

the Sign of PLUS QUALITY for PLUS PERFORMANCE

CROSS ENGINEERING COMPANY

Manufacturers • Carbondale, Penn. Telephone 300

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New York, N.Y.—101 Park Ave. MUrray Hill 5-0253

good-General. In 1952, under the name Osgood-General, unification of field-service operations of the two companies was made. Corporate structure of The Osgood Co. now includes as wholly owned subsidiaries both the Commercial Steel Casting Co. and The General Excavator Co. Edgar W. Barnhart, formerly vice-president and general manager of The General Excavator Co., has been elected vice-president and secretary of The Osgood Co., whose other officers are: Robert C. Owens, president; Ben T. Wiant, vice-president and treasurer; and John F. Lacey, vice-president for foundry operations.

The Babcock & Wilcox Co., New York, N.Y., has announced the election of W. D. Sullivan as vice-president in charge of the manufacturing department of the boiler division. He was formerly regional manager of the manufacturing department and succeeds M. Nielsen, who was recently appointed vice-president in charge of the division. Mr. Sullivan received his education at the University of Kentucky, Lexington, Ky., and joined Babcock & Wilcox in 1916.

W. D. Sullivan

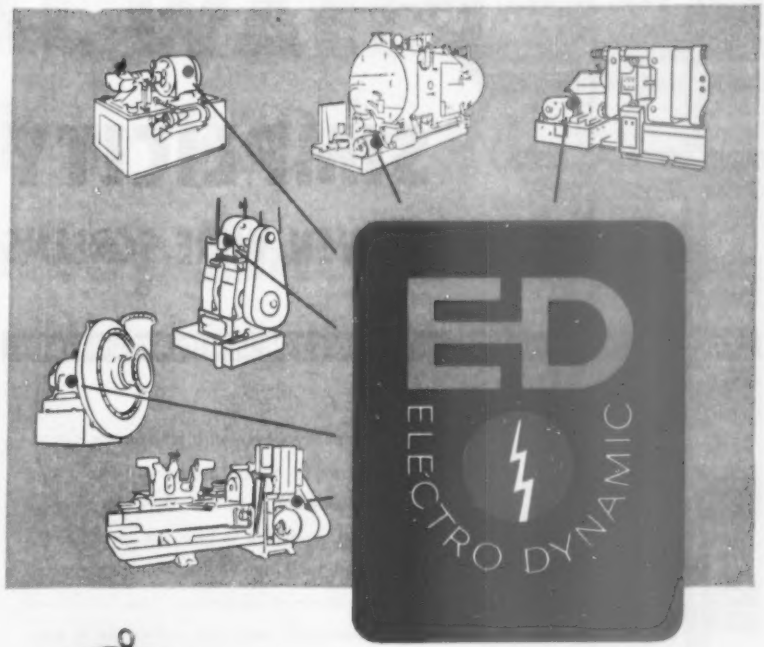
Erie Strayer Co., Erie, Penn., is the new name of Erie Steel Construction Co., manufacturers of clamshell and dragline buckets, bins, AggreMeters, batching equipment and overhead electric cranes. The change was made because the old name no longer designates its products, and it also gives recognition to the founder and president, G. H. Strayer.

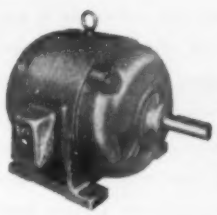
Clark Equipment Co., Benton Harbor, Mich., has appointed Dudley A. Burnett and Marshall O. Nystrom as district managers of the construction machinery division. Mr. Burnett will cover the southern, Atlantic Coast and New England districts. Mr. Nystrom will cover the 11 western states, and Oklahoma and Texas. They were both formerly with Frank G. Hough Co.

Thew Shovel Co., Lorain, Ohio, has announced the election of A. C. Lundgren as a vice-president of the company. He has been a director of the firm and director of purchases since 1946.

The Heil Co., Milwaukee, Wis., has appointed Roland Karste as district sales manager of the Detroit district office. He succeeds the late Fred W. Ehlert, who passed away November 23 while attending a sales meeting near Milwaukee.

Ludlow-Saylor Wire Cloth Co., St. Louis, Mo., has acquired the assets of the Star Wire Screen & Iron Works, Los Angeles, Calif., manufacturers of Starsteel abrasion-resistant screens,



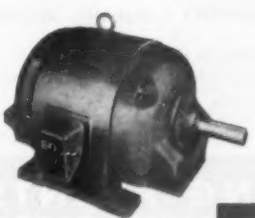


THIS EMBLEM IDENTIFIES EXTRA DEPENDABLE INDUSTRIAL MACHINERY

The red *power spot* on industrial machinery means "Powered by Electro Dynamic." Such machinery relies with confidence on the *extra dependability* of Electro Dynamic motors, the proven industrial motors which give industrial equipment *extra dependable* operation.

Conclusive evidence of the *extra dependability* of Electro Dynamic motors is now revealed in the new candid report **"MOTOR SHOWDOWN"**. The revealing proof is found in *comparative tests** conducted in accordance with A.I.E.E. standards. Don't miss your copy! Send the coupon below *today*.

*Tests certified by J. Arthur Balmford, Professor of Electrical Engineering at a leading Eastern university.



1 to 250 hp. AC and DC. Standard or special purpose. N.E.M.A. standards.

ELECTRO *xtra* **DYNAMIC** *ependable motors*

ELECTRO DYNAMIC • *Division of General Dynamics Corporation*
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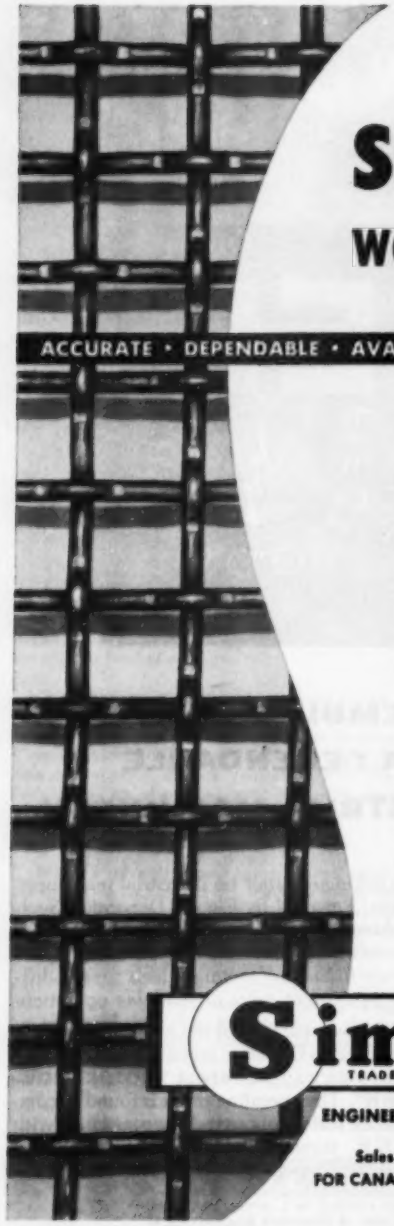

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WOVEN WIRE SCREENS

ACCURATE • DEPENDABLE • AVAILABLE FOR IMMEDIATE DELIVERY

Simplicity woven wire screens are accurately woven from high grade wire into strong, tough industrial cloth. Edges can be formed and banded to fit any type of equipment used for virtually every sizing, separating or screening operation. These screens are specifically designed and woven to give long dependable service and accurate sizing of all aggregates including limestone, gravel, sand, ore, clay and cinders. Simplicity screens in a choice of wire gauges and a wide range of openings are available for immediate delivery from large stocks in our warehouses. For further information, consult a Simplicity sales representative or write for Catalog No. 66.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

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FOR CANADA: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario

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COMPLETE CRUSHING PLANTS
designed and equipped by FARREL-BACON

Farrel-Bacon provides a complete engineering service, including design of plant and supplying all equipment from primary crusher to bin gate. Jaw-type crushers are available in sizes from 60" x 48" to 10" x 7" *Write for complete information.*

FARREL-BACON
ANSONIA, CONNECTICUT

BA-5

which will operate under the name Star Wire Screen & Iron Works, Inc.

Kansas City Hay Press Co., Kansas City, Mo., manufacturer of heavy-duty sand and gravel pumps, has announced the death of Norman H. Sooy, Sr., president. He was 69 years old. A graduate of Brown University, Providence, R. I., Mr. Sooy became president in 1927 upon the death of his father, E. C. Sooy, founder of the company.

Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has announced the appointment of Richard Herold as vice-president of foundry sales, with headquarters at High Bridge. John P. Reynolds has been named sales manager for the High Bridge plant, and Joseph A. Trainor has been made sales consultant to the vice-president.

H. K. Porter Co., Inc., Pittsburgh, Penn., announces that L. L. Garber, vice-president, has been elected a director, vice-president and general manager of The Alloy Metal Wire Co., Prospect Park, Penn., newly acquired division of the company.

Clark Equipment Co., Buchanan, Mich., has announced the election of Clarence E. Killebrew as vice-president. He was formerly manager for marketing and sales in the construction machinery division.

The Galion Allsteel Body Co., Galion, Ohio, has acquired sales and manufacturing rights to the complete line of Austin Overshot tractor loaders patented and built by John Austin Mfg. Co., Denver, Colo.

Symons Clamp & Mfg. Co., Chicago, Ill., announces that R. D. Harris, New Britain, Conn., has been appointed sales representative in New England and the Hudson River Valley. He was formerly with A. H. Harris & Sons.

Hudson Pulp & Paper Corp., New York, N.Y., is planning to move its New York sales and executive offices to the new building now under construction at 477 Madison Ave., which is expected to be completed in the Spring of 1954.

Western Machinery Co., San Francisco, Calif., has moved the Denver, Colo., office of the industrial sales division to 2400 W. Seventh Ave. Leigh M. Jones is manager of the office.

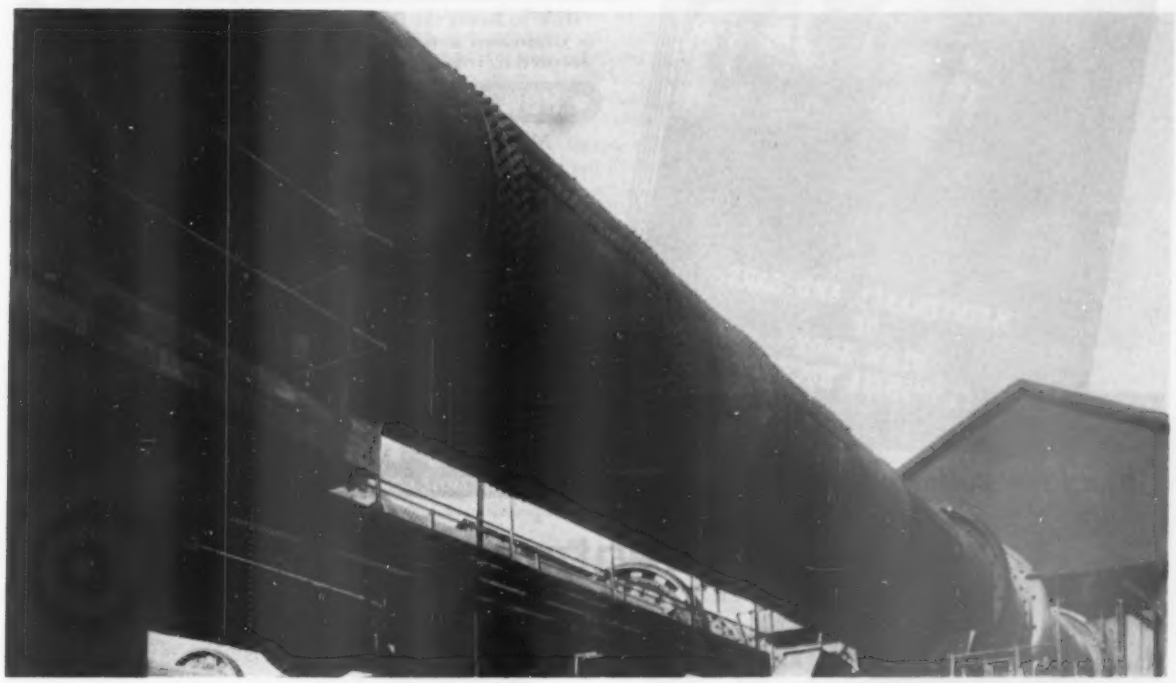
Magnolia Metal Co., Elizabeth, N. J., has acquired the physical assets and business of the Marion Brass & Bronze Foundry, Marion, Ohio, which will be operated by the newly formed, wholly owned subsidiary, the Marion Brass & Bronze Foundry, Inc.

Pollway Bearing Co., Inc., Syracuse, N.Y., has moved its Philadelphia sales office to 3701 N. Broad Street. William B. Allison, engineering representative, is in charge.

Joseph T. Ryerson & Son, Inc., Chicago, Ill., announces that Weaver E. Falberg has been appointed assistant general manager of sales of the steel

(Continued on page 139)

ORIGINAL WAELZ KILN
built in 1929 by Vulcan for
The New Jersey Zinc Co. (of Pa.)



Illustrated above is an original 10′ x 140′ kiln that was installed in 1929. It is used for the treatment of low grade zinc ore using the WAELZ process. At the time of its installation parts of the kiln included the older type supporting and thrust bearings and drive mechanism. This kiln is in daily operation after nearly 25 years of continuous service, and it is still producing its share of the product involved.

Proved Performance of a Vulcan Rotary Kiln is what the above shows . . . and this performance is also the result of fine co-operation between the engineering personnel at Vulcan and the engineering personnel and operators of The New Jersey Zinc Company (of Pa.).

This great Company along with many more throughout the United States and the world have come to regard Vulcan equipment as Good . . . Dependable . . . Equipment. If any information regarding Rotary Kilns is needed, The Vulcan Iron Works and its 105 years of experience is ready and able to serve you. Write for Bulletin No. A-442 today.

Any information on items listed below will be sent to you immediately:

- Rotary Kilns, Coolers and Dryers
- Rotary Retorts, Calciners, Etc.
- Improved Vertical Lime Kilns
- Automatic Quick-Lime Hydrators
- Briquetting Equipment
- Open-Hearth Steel Castings
- Heavy Duty Electric Hoists
- Self-Contained Electric Hoists
- Cast-Steel Sheaves and Gears
- Diesel Locomotives
- Electric Locomotives and Larrys
- Steel Plate Fabrications
- Hydraulic Presses

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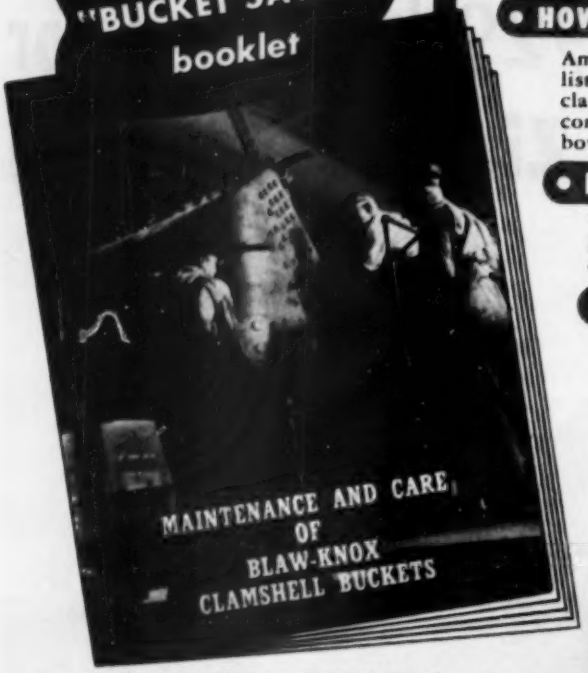
ESTABLISHED 1849

CABLE ADDRESS
"VULWORKS WILKESBARRE"

Here's your new "BUCKET SAVER" booklet



Send for Bulletin 2373 Today!

The ONLY book available that tells...

• HOW TO SAVE YOUR BUCKET

Among the many "bucket saver" suggestions are a list of "do's" and "don'ts" on the use and abuse of clamshell buckets; tips on how to prolong cable life; common operating mistakes that make bucket lips bow in or bend out.

• HOW TO GET MORE OUT OF YOUR BUCKET

"How to Reeve the Bucket for Maximum Efficiency" is illustrated and described in detail. One page is devoted to instructions for operators.

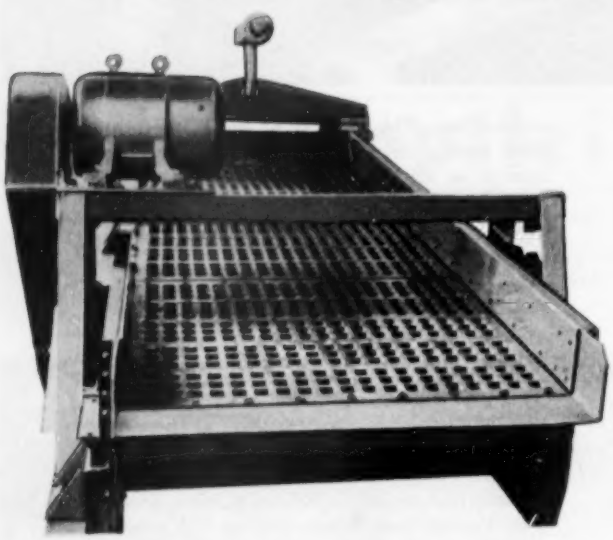
• HOW TO REPAIR BUCKETS

Methods of renewing the cutting edges of worn bucket lips with special welding precautions. This section also contains instructions for removing and replacing ball bearings in lever arm sheaves, lubrication instructions, and many other practical hints for bucket care and maintenance.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
PITTSBURGH 38, PA.
Offices in Principal Cities

BLAW-KNOX CLAMSHELL BUCKETS
THE MOST COMPLETE RANGE OF SIZES AND TYPES

Takes rough treatment in its stride



Hendrick Perforated Metal Plate takes the knocks and bruises of constant heavy-duty screening without altering uniformity of material. Because the holes can not stretch, Hendrick Perforated Plate assures large quantity screening without expensive, time-wasting blinding. And decks can be changed quick-as-a-wink! Supplied either flat or corrugated, Hendrick Perforated Metal is available in any desired shape and size of openings in high carbon, stainless steels and in other commercially rolled metals.

Write for further details—or phone Hendrick direct.

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Sales Offices in Principal Cities

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

Manufacturers' News

(Continued from page 136)

service plants, with headquarters in Chicago. He was formerly manager of the alloy steel division. Roland W. Burt has been named manager of the Chicago plant. He was formerly sales manager, Chicago, and will be succeeded by Alfred J. Olson, assistant sales manager.

E. D. Bullard Co., San Francisco, Calif., announces that Joseph L. Polizoto, formerly assistant manager, has been appointed manager of the Los Angeles office.

Atlas Powder Co., Wilmington, Del., has appointed Harry L. Moat as assistant to the director of operations, explosives department.

Pioneer Engineering Works, Inc., Minneapolis, Minn., has announced the appointment of Elton T. Fair as district sales representative in Colorado, Wyoming, the greater part of Montana, western half of South Dakota and five western counties of North Dakota.

Allison Division of General Motors Corp., Indianapolis, Ind., has opened a sales office in Berkeley, Calif., with W. C. Edwards as West Coast sales engineer and F. S. Strain as West Coast service representative.

Air Reduction Sales Co., New York, N.Y., has produced a sound slide-film on safety in the use of oxyacetylene cutting and welding equipment. Entitled "The Guy Behind Your Back," free showings of the 20-in. film may be arranged for by contacting the company's office in your vicinity.

U. S. Electrical Motors, Inc., Los Angeles, Calif., has started construction of an $8,000,000 plant on an 89-acre site in Anaheim, Calif. The first unit will house the defense products division for the manufacture of aircraft electrical motors.

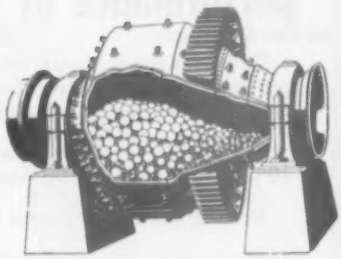
St. Paul Hydraulic Hoist, division of Gar Wood Industries, Minneapolis, Minn., has announced the appointment of John E. Brown as district manager of the north central territory, which comprises Milwaukee, Wis.; Fort Wayne, South Bend and Indianapolis, Ind.; Decatur, Springfield and Chicago, Ill.; and Davenport, Iowa.

Worthington, Corp., Newark, N. J., announces that Paul Diserens, consulting engineer and until 1952 director of research and development, has retired after 45 years of service with the company.

The Timken Roller Bearing Co., Canton, Ohio, has announced formation of a new sales organization, Timken Roller Bearing de Mexico, with headquarters in Mexico City, to handle sales of its products.

Denver Equipment Co., Denver, Colo., announces the death on January 18 of W. O. P. Fullerton in Fort Collins, Colo.

GRINDING MILLS



- CONICAL MILLS
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- ROD MILLS
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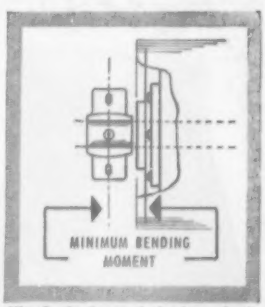
LINK-BELT assembles pulley on shaft—insures correct keyseat alignment

YES, you get a two-way dividend because Link-Belt mounts belt conveyor pulleys on their shafts at the factory. What's more, the flush-hub construction means better operation.

Made with either crowned or straight face, they are available with vulcanized lagging, either plain or herringbone. Your choice of bolted or taper lock hubs.

You can get complete information on belt conveyor pulleys from your Link-Belt salesman. Call him today.

Link-Belt line includes welded steel and gray iron pulleys as well as welded steel slat pulleys. Popular sizes are stocked.



Flush hubs minimize shaft deflection, cut hub bolt stress and disc deflection.

LINK-BELT
WELDED STEEL CONVEYOR PULLEYS

13,424-A

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This is a photograph of Manganese Hammers in a primary mill used to crush hard Dolomite.

They were rebuilt for less than 30% of the cost of new hammers.

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Let our field man show you how similar savings can be effected in your equipment and operation.

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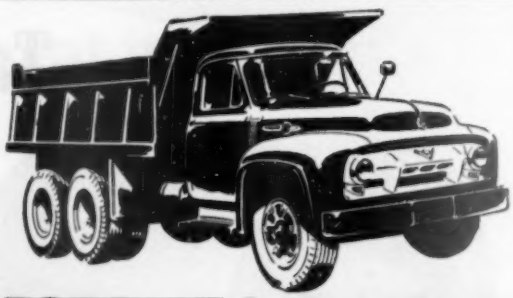

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Macwhyte makes a thousand and one ropes to meet the needs of every type of equipment. Each is built with the exacting care that long, low-cost service demands.

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Macwhyte 6 x 41 Filler Wire PREformed Lang Lay Monarch Whyte Strand with IWRC

1045

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LOADALL

DIGS IN WHILE STANDING STILL!

Check these Features!

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- **SAFETY.** Operator has unrestricted visibility and is protected from loader arms.
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- **LOW COST.** You save on first cost, operating costs and maintenance costs with a LOAdALL.
- **LOAdALL BUCKETS.** Available with capacities of ⅜, ¾, ⅞, 1, 1¼ and 1½ yards.

A HIGHLY MANEUVERABLE POWER SHOVEL

Lessmann LOAdALL scoops up big loads of the most heavily compacted soils, cinders, aggregate, etc. . . . does it in 5 seconds while standing still! Extra hydraulic cylinders supply Hydraulic Power Crowd. This means *loading* with hydraulics which eliminates ramming and spinning of wheels . . . *minimizes repairs, reduces maintenance!* Dozer blade is easily attached for grading, backfilling. Crane-hook, lift forks, snow and trash buckets are also available.

9 FT. DUMPING CLEARANCE

LOAdALL has clearance for the highest trucks, bins and mixing hoppers. It loads or unloads at any height from 12" below wheel level to 108" above. Wheelbase of 73" and 12' turning radius make it highly maneuverable.

52" REACH

Here's a full 4'4" reach at maximum clearance! LOAdALL carries load close but quickly boosts it *'way out ahead* for easier loading . . . another advantage of Hydraulic Power Crowd.

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INFORMATION

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TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

1 **BIN LEVEL INDICATORS**—Bin-Dicator Co. has brought out its 1954 catalog describing and illustrating the line of automatic bin level indicators for bulk materials. Installation data, wiring diagrams, dimensions, and a description of the Bin-Flo aerator unit are included.

2 **CEMENT COLORS**—American Dyewood Co. has released a pocket-size brochure which describes the full range of "Nycolime" colors and their applications.

3 **CONVEYORS**—Stephens-Adamson Manufacturing Co. has issued Vol. 207, a 14-page booklet, describing and illustrating typical applications of its conveyors.

4 **CRANES AND SHOVELS**—Schield Bantam Co. has issued the "Bantam City Press," a bulletin produced in the form of a four-page newspaper. Stories, pictures and specifications are featured concerning its ⅜-cu. yd. 5-ton crawler model C-35, as well as specifications and pictures of the crane carrier for mounting on Model T-35 truck-mounted Bantams.

5 **CRANE-SHOVEL**—The Thew Shovel Co. has issued a 24-page bulletin describing the Lorain Model 820-K shovel-crane. Features, performance information, and action views are given as well as detailed views of the operating mechanisms of the crawler, turn-table and front end equipment.

6 **DIESEL ENGINES—ELECTRIC SETS**—Caterpillar Tractor Co. has issued an eight-page form D383 entitled, "Been Robbed Today?" The booklet points out a few ways an owner may be robbed by poor functioning of his equipment and how he may guard against it. On-the-job applications of diesel engines and electric sets are illustrated.

7 **DIESEL ENGINES AND ELECTRIC SETS**—Caterpillar Tractor Co. has published Form D309 entitled, "Power and Profit in Construction and Mining," which gives illustrations and descriptions of diesel engines and electric sets. Detailed charts show the rated horsepower of the diesel engines and the kilowatt output of the electric sets.

8 **DIESEL EQUIPMENT**—Cummins Engine Co., Inc., has prepared a publication entitled, "Cummins Cuts Contractors' Costs," describing and illustrating various projects where its diesel equipment has been utilized. The New York State Thruway operations are also described and illustrated.

9 **DIESEL TRACTOR**—Caterpillar Tractor Co. has issued Form 30937 describing the oil type clutch and other operating details of the Cat D7 tractor. A detailed specification sheet and a detailed cutaway illustration of the tractor are included.

10 **DISTRIBUTION TRANSFORMERS**—Westinghouse Electric Corp. has released Booklet B-6134 describing Type SL distribution transformers. Choices of windings, method of tap changing outside the tank, and accessories are also discussed.

11 **ELECTRIC VIBRATORS**—Cleveland Vibrator Co. has published an illustrated catalog, No. 10, announcing a line of electric vibrators. An engineering data sheet is included.

12 **FLAME CUTTING WELDMENTS**—Air Reduction Sales Co. has released a 12-page booklet entitled, "Advanced Automatic Flame Cutting for Machinery Weldments," reprinted from *The Welding Journal*, telling how the Marion Power Shovel Co. converted from castings and riveted structures to weldments.

13 **FLEXIBLE COUPLINGS**—Lovejoy Flexible Coupling Co. has announced a 20-page catalog on its flexible couplings, giving specifications and dimensions, typical application photographs and drawings.

14 **FLUORSPAR PLANT**—Denver Equipment Co. has brought out Bulletin M4-B69 describing the "acid grade" fluorspar plant of Ozark Mahoning Co., Northgate, Colo. Data on the geology of fluorspar deposits, photographs and a flowsheet are included.

15 **FUEL ADDITIVE**—Towmotor Corp. has released a folder announcing a fuel additive developed by the company. Power and performance advantages are described.

16 **GEARMOTOR ADAPTATION**—Westinghouse Electric Corp. describes the integral-type Motorcylinder gearmotor adaptation for material-handling applications in Bulletin B-6090. Included are ratings, characteristics, and operational and maintenance features.

17 **HOES**—The Thew Shovel Co. has brought out a 15-page booklet showing typical applications of the Lorain line of hoes. Also shown are extra long booms and sticks adapted for deep digging.

18 **HYDRAULIC HOISTS**—Gar Wood Industries has released Form No. W-129 describing and illustrating Model 2825 and 2025 arm-type hydraulic hoists. Specifications are included.

19 **KILN CONTROL SYSTEMS**—The Bristol Co. has announced Bulletin P1260, on its complete control systems for furnaces, ovens, dryers and kilns. Detailed engineering specifications, ordering information, application and dimension drawings and over 100 photographs are included in the 48-page bulletin.

20 **LABORATORY OVENS**—Fisher Scientific Co. has published Bulletin FS-230 listing and describing its line of "Isotemp" ovens for research, testing, quality control, clinical and educational laboratories. Dimensions, drawings and photographs are included.

21 **LIQUID LEVEL CONTROL**—Minneapolis-Honeywell Regulator Co., Industrial Div., describes 12 different systems for measuring and controlling liquid level in its 24-page Bulletin 1160. Brief general sections are included on measurement, transmission and control, and the handling of difficult liquids.

22 **LOADER**—Athey Products Corp., describes and illustrates the Force-Feed Hiloader in an eight-page booklet. Actual job data, typical application photographs and specifications are also included.

23 **MACHINERY SLEEVES**—A & A Manufacturing Co. has announced Bulletin AH-2 describing and illustrating Gortite sleeves for pliable protection. Dimensions and drawings are also given.

24 **MASONRY CEMENT**—Medusa Portland Cement Co. has issued a technical catalog, No. 3-A-9, describing BtoneseT, non-staining white masonry cement. Specifications and typical application photographs are included.

25 **MOTOR STARTERS—PUSH BUTTONS**—General Electric Co. has issued Bulletin GEA6061 giving selection information on motor starters and push buttons. Also included are equipment photographs, circuit diagrams, and brief application data.

26 **PNEUMATIC TOOL ACCESSORIES**—Brunner & Lay, Inc., has issued a 12-page folder, No. T-11-3P, illustrating and describing pneumatic tool accessories; such as, clay spades, rock-drill bits, asphalt cutters, etc. Specifications and application information are also given.

27 **POWER SHOVEL FOR UNLOADING**—The Jeffrey Manufacturing Co. has released Bulletin 863 describing an automatic power scoop for one-man operation in unloading bulk materials from box cars. Application data, a typical arrangement drawing, dimensions and photographs are given.

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28 POWER SHOVELS AND CRANES—The Thew Shovel Co. has published a 24-page bulletin describing and illustrating the crawler-mounted power shovels and cranes in the 1-cu. yd. Lorain "50" series. Design, construction, and operation views are given.

29 PROCESS CONTROL EQUIPMENT—Barber-Colman Co., Wheelco Instruments Div., has issued Bulletin F 5633-1 describing its line of instruments for industrial process control applications. Also included is a description of Flame-otrol combustion safeguards.

30 PROCESSING FACILITIES—Kaiser Aluminum & Chemical Corp., Chemical Div., has released a 16-page illustrated booklet describing the processing facilities at its dolomite quarry and plant at Natividad, Calif., and magnesia seawater and refractory brick plants at Moss Landing, Calif.

31 PULVERIZER—Combustion Engineering, Inc., Raymond Div., has published Bulletin 73 describing the Ray-Ducer hammer-type pulverizing mill with screen separation.

32 PUSH BUTTONS—General Electric Co. has brought out Bulletin GEA-5779B describing and illustrating a line of oil-tight push buttons, indicating lights, selector switches and accessories. Included are cross-section drawings, full color application photos and dimension and outline diagrams.

33 QUARRY SAFETY — National Safety Council has published a 40-page booklet entitled, "Safety in Quarry Operations," covering organizational topics; such as safety committees, accident investigation and records, and medical and first aid facilities. Sections on explosives, railway and truck transportation, and physical problems; such as, scaling the face, drilling, etc. The booklet is available to Council members for $1.25 and to nonmembers for $2.50, and may be obtained by writing the Council at 425 N. Michigan Ave., Chicago 11, Ill.

34 REPLACEMENT CHAINS — Kensington Steel Co. has issued a 12-page catalog, Bulletin 1053, listing Kenkrome replacement chains for cement, sand, gravel, crushed stone, brick and clay plants. Also covered are renewable tooth sprockets, crusher parts, dipper tooth points and bases, crawler treads, and idlers made from Supermang, Oroloy or Kenkrome.

35 RESEARCH AND CONTROL INSTRUMENTS—North American Philips Co., Inc., Research & Control Instruments Div., has released a 64-page reference book entitled, "Research and Control Instruments—X-ray and Analytical Equipment." Application information and typical charts are given.

36 SAFETY TREADS—Wooster Products, Inc., has brought out a 12-page catalog showing a variety of metal safety treads and accessories; such as, plates, curb bars, window and elevator sills, etc. Installation sketches are also given.

37 SEPARATORS—Southwestern Engineering Co., SWECO Separator Div., has released Data File No. 106-14 describing its separators. A four-color cutaway engineering drawing of the vibrating screen device is included, as well as typical application photographs.

38 SERVICE METHODS—Caterpillar Tractor Co. has released illustrated Form D381 discussing the service methods used by its dealers in the shop and in the field. A map of the United States, Canada and Mexico is included, showing the location of dealers, parts depots and factories.

39 SPEED DRIVE CONTROLS — Reeves Pulley Co. has announced Bulletin G-537 which describes the complete line of automatic controls available on its variable speed drives. Schematic engineering drawings are included with a description of each type of available control.

40 SPOT WELDING—Air Reduction Sales Co. has brought out a four-page folder describing and illustrating the "Aircospot" inert gas-shielded spot welding process and equipment. Physical and electrical specifications, and operating data are given.

41 STEAM HOSE—Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., has released a bulletin describing its line of steam hose and their uses. Cross section and cutaway views show the various types of construction. Performance data, sizes, weights and working pressures are listed. Information on the different kinds of couplings best suited for specific uses is also included.

42 STONE-SETTING MORTARS — United States Department of Commerce, National Bureau of Standards has published "Building Materials and Structures Report 139." Bond tests, linear dimensional changes, volume shrinkage, resistance to freezing and thawing, effect of different curing conditions, and relation of mortar to masonry performance are explained. Tables and photographs are used throughout. The booklet is available at a cost of 20¢ from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

43 STORAGE BINS—The Heltzel Steel Form and Iron Co. has announced an illustrated booklet describing overhead steel storage bins, installation and multi-compartment arrangements, and gate and discharge methods.

44 TAUTLINE CABLEWAYS — Sauerman Bros., Inc., has released a 16-page catalog, Section G, describing and illustrating tautline cableways. Photographs, sketches and text describe types, spans, working loads and other details.

45 THERMOCOUPLE — EXTENSION WIRES—Minneapolis-Honeywell Regulator Co., Industrial Div., has brought out a six-page specification sheet, No. 307, listing and describing the sizes, accuracies, chemical compositions, weights and prices of thermocouple and extension wires.

46 THERMOCOUPLES—The Foxboro Co. has issued Bulletin 235-5 entitled, "Thermocouples and Accessories." Descriptions, illustrations, dimensional drawings, specifications, and 10 installation diagrams are given. Parts lists for each type thermocouple are included, along with catalogued sections on supplies and accessories.

47 THREADED SOCKETS—Star Expansion Products Co., Inc., has brought out two folders describing, respectively, its threaded sockets designed for use in the precast concrete industry, and adapter plugs for use with the sockets. Line drawings illustrate typical uses and installation details.

48 TRANSMISSION BELTING — B. F. Goodrich Co. has announced a catalog describing and illustrating the construction features of various industrial belts, with recommended uses. The methods of making the Flylock belt joint is described with accompanying illustrations.

49 V-BELTS—Raybestos-Manhattan, Inc., Manhattan Rubber Div., has issued Bulletin 6628 describing R/M Super-Power V-belts. Its advantages are outlined and a size list is given.

50 V-BELTS — Manheim Manufacturing & Belting Co. has published an eight-page catalog on the patented Veolos TD and TE adjustable V-belt for D and E belted drives. The studs, cup-washers and T-screws of the belt are illustrated in detail. Installation and operation characteristics are explained, and tables and typical drive photographs are given.

51 WELDING SCHOOL—Hobart Trade School has issued a 24-page pictorial booklet describing the curriculum and organization of its school for training welding operators.

52 WIRE REINFORCED HOSE—The Flexaust Co. has issued Catalog 35 describing and illustrating spiral wire reinforced hose and accessories for moving air, gases or materials via pressure, suction and gravity. Specifications, installation data and friction loss data are also given.

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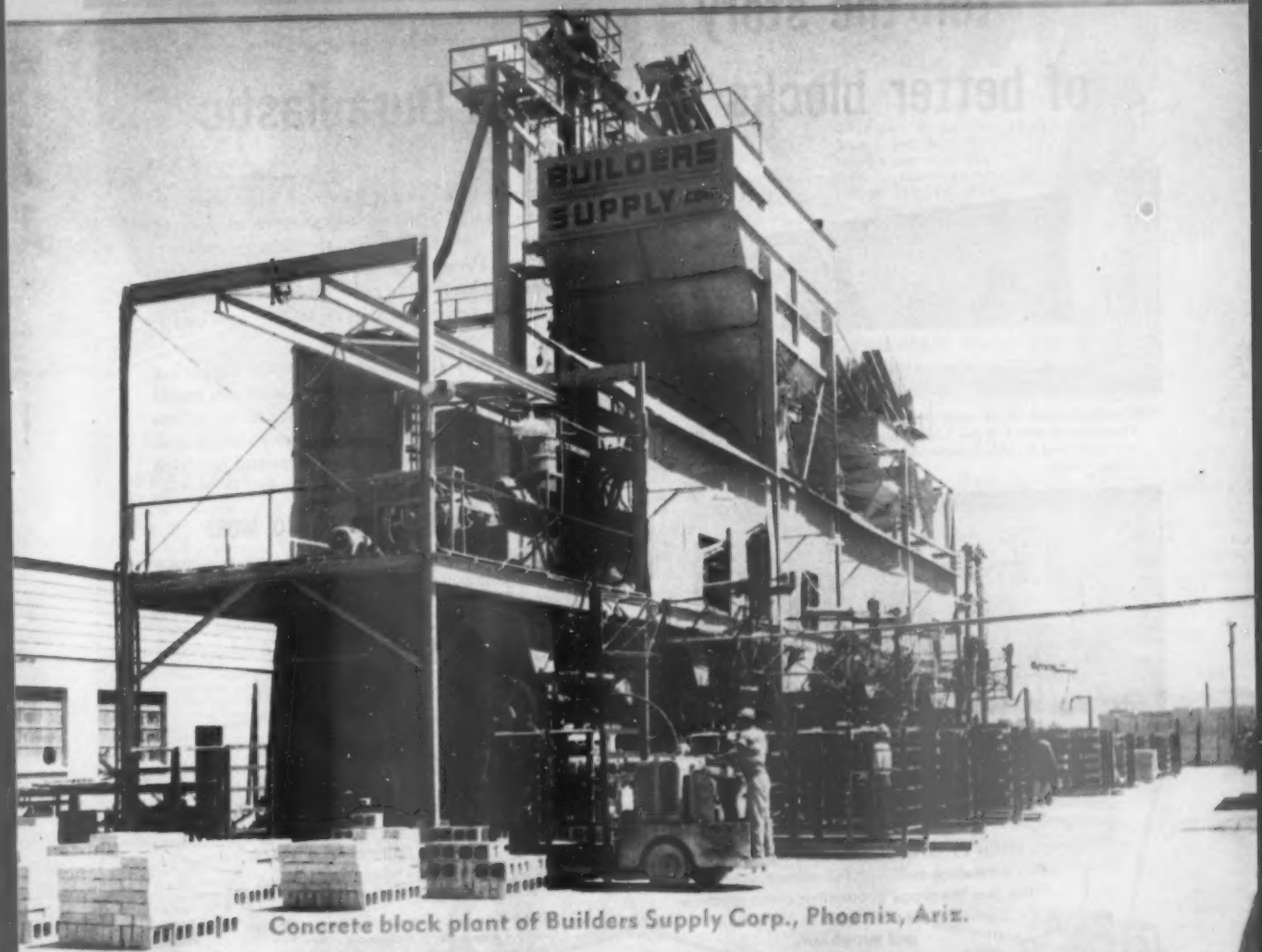

Concrete block plant of Builders Supply Corp., Phoenix, Ariz.

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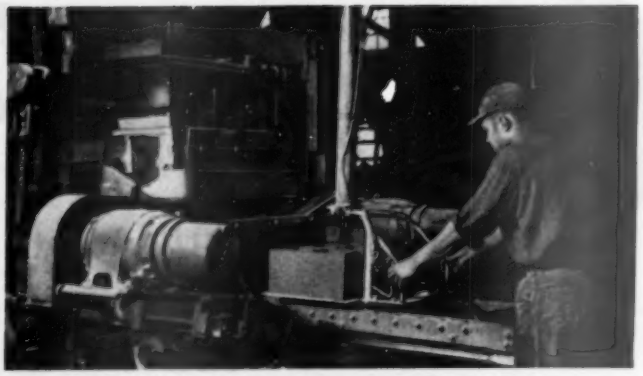
"Our repeat sales tell the story of better blocks made with Duraplastic*"



Lima Cement Products Company workman lifts three green concrete blocks made with Duraplastic from machine.

HERE is Standard Oil of Ohio's bulk storage building at Lima. Duraplastic block from Lima Cement Products Company was specified by sub-contractor for masonry Floyd Stemen, Lima, Ohio.

HERE, TOO, Stemen chose Duraplastic-made block from the Lima Cement Products Company. This is the new Kresge store on the main street of Lima.

"We've found that uniformity and high strength of concrete blocks are two big factors in getting repeat orders," says Bill Ebling, vice-president, Lima Cement Products Co., Lima, Ohio. "During the last seven years we've depended on Duraplastic air-entraining cement to help us build these qualities into our product."

More and more manufacturers are discovering the repeat sales appeal of concrete products made with Duraplastic...the economy this cement offers in production and handling. Mixes are rubbery and cohesive, feed easily through machines and produce concrete highly resistant to the passage of water.

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It sells at the same price as regular cement and requires no unusual changes in procedure. Complies with ASTM and Federal Specifications. For descriptive booklet, write Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

NIFTY SAYS: The appearance of Duraplastic-made products works for you as a built-in salesman. Customers go for the clean, true edges and the richer face texture—especially when harsh aggregates are used.

THRIFTY SAYS: Build up profits and cut down production costs with Duraplastic. Manufacturers find less breakage in handling green machine-made products . . . fewer costly culls and throwbacks.

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*"Duraplastic" is the registered trade-mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

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- CUT FASTER
- LAST LONGER
- AT LOWER COST

MODEL HD
15 MODELS
PRICED FROM
$265

MODEL C-130
ONE OF 5 MODELS
GAS OR ELECTRIC
POWERED

Clipper Superior Blades are guaranteed to . . . "Provide the Fastest Cut . . . at the Lowest Cost!"

Clipper Superior Blades are manufactured under rigid control . . . assuring consistent quality. You are guaranteed peak performance . . . at the lowest possible cost with every blade.

CLIPPER BLADES to fit Every Make and Model Masonry — Concrete — Hand Power Saw

Your guarantee of the finest, fastest, most economical masonry and concrete cutting is the familiar Clipper Trade Mark on a Wet Abrasive — Dry Abrasive — "CBR" (Break-Resistant) — or a Diamond Blade.

ABRASIVES

Any masonry material can be cut in seconds with either a "WET" or "DRY" specification. New type Clipper Abrasive Blades approach the cutting speed of diamonds.

DIAMOND

No other means of masonry or concrete cutting can equal the cutting speed of a Clipper Diamond Blade. Only Clipper has every necessary specification to do your cutting job.

"CBR" Break-Resistant

Drop — Bend — Twist . . . they're virtually unbreakable! 50% to 100% longer blade life on softer ranges of materials. Ideal for both masonry and hand power saws.

Nearly 20 Years Experience Behind *Genuine* CLIPPER PRODUCTS

The unqualified Clipper guarantee of satisfaction is backed by nearly 20 years of world-wide experience, the ability to select the finest materials and the "know-how" to put them together.

Today! **. . . try the NEW— Faster Cutting—Economical CLIPPER SUPERIOR BLADES**

Why guess about performance? Why experiment? Why take a needless loss? At our 24 locations you will find a Clipper Specialist who can tell you exactly which Clipper blade will give you the fastest cut at the lowest cost on your materials.

TRY A Clipper® MASONRY SAW OR CONSAW ON FREE TRIAL

Clipper®

KANSAS CITY 8, MISSOURI

COAST TO COAST

• PHILADELPHIA	• BOSTON	• SAN FRANCISCO
• ST. LOUIS	• HOUSTON	• CINCINNATI
• CLEVELAND	• MILWAUKEE	• ATLANTA
• DETROIT	• ST. PAUL	• WASHINGTON, D.C.
• AUSTIN, TEX.	• INDIANAPOLIS	• BIRMINGHAM
• CHICAGO	• NEW YORK	• CHARLOTTE, N.C.
• LOS ANGELES	• PITTSBURGH	• DALLAS
• NEW ORLEANS	• DENVER	• KANSAS CITY

IN CANADA — P.O. BOX 476, WINDSOR, ONTARIO

SOLD ONLY DIRECT FROM FACTORY BRANCHES

MAIL COUPON NOW

CLIPPER MANUFACTURING CO.
2807 W. WARWICK • KANSAS CITY 8, MO.

Send FREE Literature and Prices on:

- ☐ CLIPPER ABRASIVE BLADES ☐ WET ☐ DRY
- ☐ CLIPPER "CBR" (Break-Resistant) BLADES
- ☐ CLIPPER DIAMOND BLADES—MASONRY
- ☐ CLIPPER DIAMOND BLADES—CONCRETE

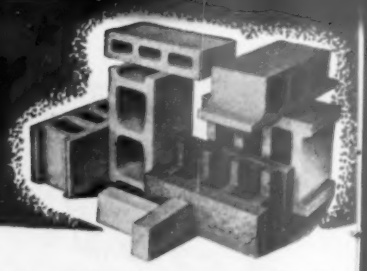
No. 100

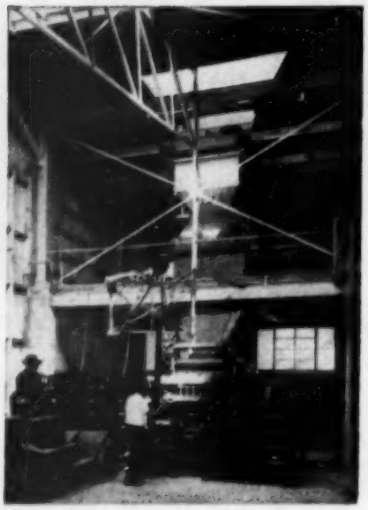
COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Another BESSER Booster





Besser Front Pallet Feed Vibrapac installed in the Winstone New Zealand plant. Fully automatic. Three 8" x 8" x 16" modular block produced on one Plain Pallet. Other sizes produced in equivalent multiples on the same set of Plain Pallets.

New Zealand's Largest Concrete Masonry Plant Steps Up Block Production with VIBRAPACS

When Winstone Ltd. decided to build the largest plant in New Zealand for the manufacture of high-quality concrete masonry units, they were determined to get a Besser Automatic Vibrapac, although it meant importing the machine from the Besser Company, 10,000 miles away.

The entire Winstone plant is constructed and equipped to insure scientific control of each manufacturing process, in strict conformity to the latest concrete engineering principles. Building block, in a complete range of sizes, are produced to true modular dimensions. The automatic Vibrapac and laboratory control assure perfect uniformity.

Winstone Ltd. is only one of the many block plants all over the world that prefers Besser Vibrapacs for producing BETTER block, on a fast production basis, with a minimum of downtime.

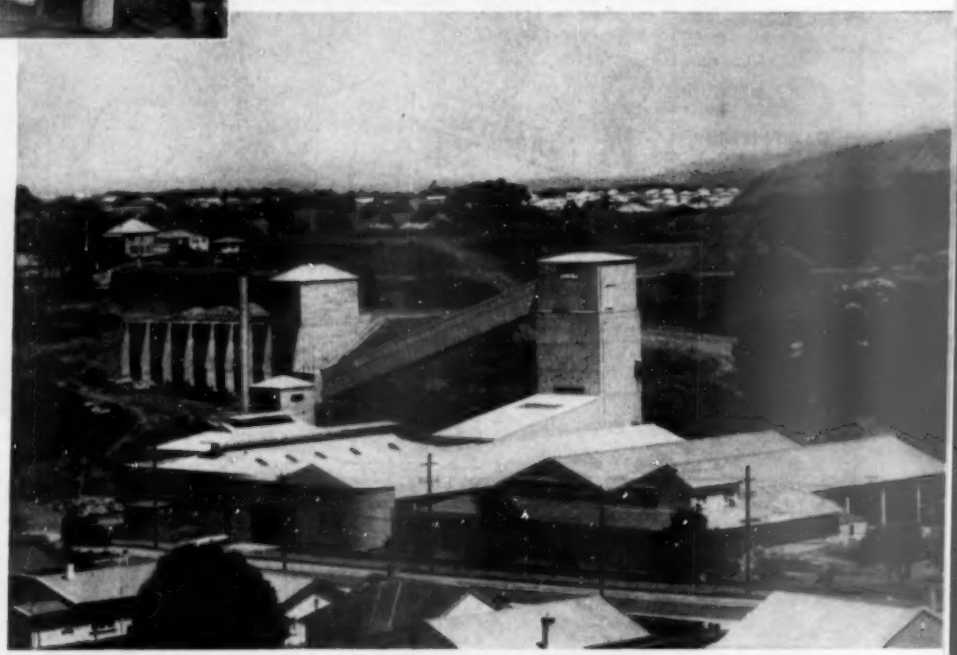
BESSER MANUFACTURING CO. • Box 135 • ALPENA, MICH.

Complete Equipment for Concrete Products Plants

Delivering the green block to the curing rooms. Vibrapac block is high temperature cured for greater strength, true dimensions and clean, sharp edges.

Cured block stacked in the Winstone warehouse. Cubing of block by power eliminates outmoded hand lifting of block. Speeds up deliveries.

★ This is the 106th of a series of ads featuring leaders in the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.



Exterior view of Winstone Ltd. plant, Auckland, New Zealand. This modern plant has every facility for the large-scale manufacture of Vibrapac Concrete Block.

BESSER 50th Anniversary 1904-1954

A Half Century of Concrete Masonry Progress!

INDUSTRY NEWS

Concrete Products Meeting

THE MO-KAN CONCRETE PRODUCTS ASSOCIATION recently celebrated its third anniversary with a dinner and meeting at Kansas City, Mo., attended by over 60 members and guests. President L. L. "Mike" Daugherty installed the new officers of the association for 1954. The new officers are: Gus Main, Kansas City Concrete Pipe Co., president; Lawrence Weston, Cinder Concrete Products Co., vice-president; Dale Williamson, City Block & Products Co., secretary; and George W. Kulhavy, The Carter-Waters Corp., treasurer.

Several members of the association also attended, at a later date, a meeting of architects, Federal Housing Administration officials and other guests, at which C. A. Sirrine, Detroit architect and also executive secretary of the Concrete Products Association of Michigan, was the guest speaker. The topic of Mr. Sirrine's address was "Inside Concrete Masonry."

Opens Branch Office

NORTHWEST LIFT-SLAB CO., INC., Spokane, Wash., has announced the opening of a Seattle office in the Pine Building. A Portland, Ore., office will be established in the near future.

Lift Slab is the technique of lifting concrete floor and roof slabs to their final position in a structure after they have been poured and finished, and have attained their design strength at grade level. This system, technically known as the Youtz-Slick method, was developed in Texas in 1947 and, until recently, franchises were issued by the Southwest Research Institute. At present, United States Lift-Slab Co., Inc., has control of all the Youtz-Slick rights.

The first franchise granted under this new organization was to Northwest Lift-Slab Co. The firm is capitalized at $150,000, and has the franchise for Washington, Oregon, Idaho, Montana and Alaska. James J. Breen, Spokane, is president and in charge of operations in eastern Washington, Idaho and Montana. Other officers are Edward M. Watson, Seattle, vice-president and in charge of western operations; J. H. Maguire, secretary-treasurer and superintendent of construction; and Kenneth P. Norrie, Spokane, engineering consultant.

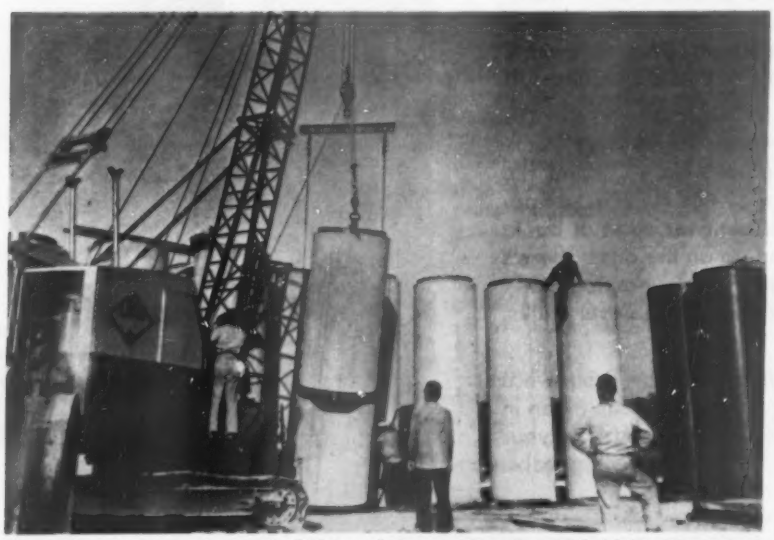
Cover Picture

THE ILLUSTRATION on this month's cover shows an overall view of the Builders Supply Corp., plant at Phoenix, Ariz., claimed to be the largest producer of concrete block in the United States. Over 35,000,000 block were produced in 1953 at this plant. Six Besser Vibrapac machines are operated. Some unusual plant practices are followed, including the handling of two cubes to a flat rack truck, reclaiming of hot water condensate from curing rooms, etc.

Acquires Pipe Company

LOCK JOINT PIPE CO., East Orange, N. J., has purchased Great Lakes Concrete Pipe Co., Inc., Buffalo, N.Y., as recently announced by H. S. Howe, a vice-president of the New Jersey company.

The Buffalo plant, together with a new plant being built by Lock Joint Pipe Co., at Henrietta, N.Y., near Rochester, will be operated by a wholly-owned subsidiary of Lock Joint Pipe Co. The present firm name will be retained.



Shown above is the casting yard of Universal Concrete Pipe Co.'s Philadelphia (Norristown), Penn., plant, which is working on a project to produce two miles of 48-in. concrete pressure pipe in 16-ft. sections

MARSHALL CONCRETE PRODUCTS, INC., Minneapolis, Minn., has announced completion of its new concrete block and ready-mixed concrete plant. The new plant will begin delivery of Haydite ready-mixed concrete about April 1. This is the second concrete products plant to be established by the company.

METROPOLITAN SAND & GRAVEL CO., New York, N.Y., recently announced acquisition of two ready-mixed concrete plants on Long Island, N.Y., one being located at Garden City and the other at Farmingdale. This increases to eight the number of ready-mixed concrete plants owned and operated by the company in metropolitan New York.

GREENVILLE CONCRETE PRODUCTS CO., Greenville, Ohio, was recently purchased by Harold Snider, from Shurte Concrete Products Co., Richmond, Ind. The firm was recently incorporated under Ohio law by Mr. Snider, L. E. Blanchard and J. C. Patty, all of Greenville.

EL CERRITO BUILDING MATERIALS CO. is building a $200,000 concrete batching plant at Richmond, Calif. The company has a contract to supply ready-mixed concrete for the Richmond-San Rafael bridge. Frank Addiego is plant manager.

MACKEY SAND & GRAVEL, Platner, Colo., has added a ready-mixed concrete plant to its sand and gravel operations. New facilities include two 3-cu. yd. transit-mixer trucks. The company recently moved its office from Akron, Colo., to Platner.

SUPERIOR STONE PRODUCTS, Round Rock, Texas, has been sold by Frank Quinn and associates to James Motheral, Austin, Texas, who will continue to operate the plant under the same firm name.

CLAYTON READY MIX CONCRETE CO. is the newest ready-mixed concrete plant in South Jersey. The owners and operators are Frank Rizzo and William Numbers, Woodbury, N. J.

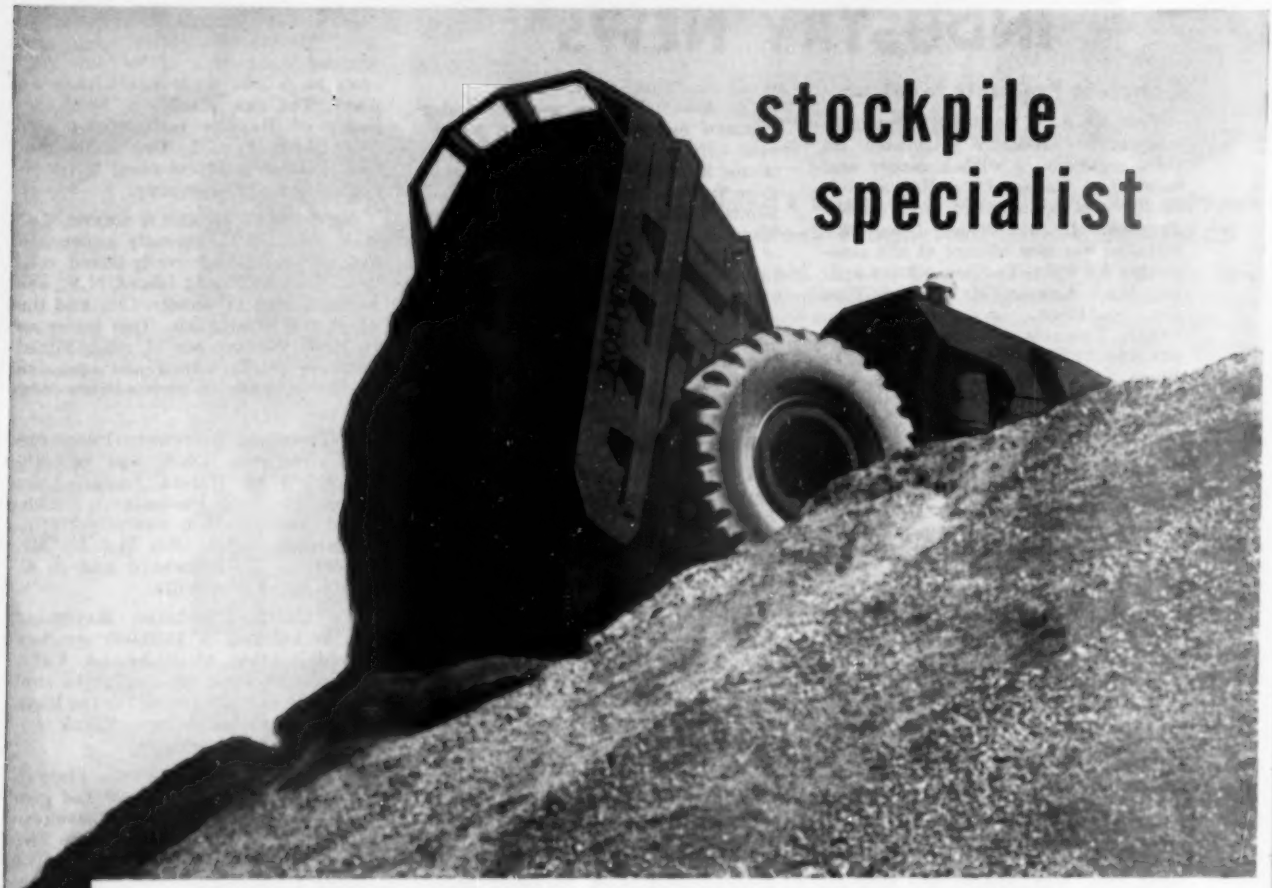
KEASBY & MATTISON CO., Ambler, Penn., recently began operation of its new $2,750,000 asbestos-cement pressure pipe plant at Santa Clara, Calif.

TORRESDALE BLOCK CO. was recently established at Philadelphia, Penn., by Clyde Banks. The company will produce Waylite cinder block, concrete block and artificial stone.

E. L. SCHWADERER, Cass City, Mich., recently announced the installation of new machinery and material handling equipment for the complete modernization of his concrete and concrete block plant at Cass City.

JACKSON READY-MIX CONCRETE, Jackson, Miss., has announced plans to expand its present operations by the addition of a concrete block plant.

HOSKINS READY MIX CONCRETE has been established at Duncanville, Texas, by Wilford Hoskins.



stockpile specialist

KOEHRING 6-yard DUMPTOR®

puts stockpiling on a fast, shuttle-haul basis. There's no need to turn at the loader, or on top of the pile, because constant-mesh transmission gives full-speed travel in either direction. This no-turn advantage saves at least 2 slow turns on every trip . . . cuts 30 seconds off normal cycle time.

To dump, operator drives up to edge of stockpile, trips the body-release lever . . . and the gravity-dump body instantly tilts 70°. Fast dumping action kicks the load out over edge of bank, saves a lot of dozer clean-up on the pile. There's no 15 to 25-second wait for slow-acting body hoists. What's more, gravity-dump never balks, never wears out.

Let your Koehring distributor show you what these practical Dumptor advantages can mean in increased production and lower costs on your stockpiling and other off-road hauling jobs.

CK430

KOEHRING COMPANY, Milwaukee 16, Wisconsin (SUBSIDIARIES . . . .

Stockpiling operation (above) shows typical no-turn shuttle advantage. Dumptor drives up to the edge of stockpile, body forward . . . dumps, and heads back for the next load, without turning.

From top of stockpile, Dumptor returns to loader via access ramp . . . or, as shown at left, can continue on down side of stockpile after dumping load. (Climbs 24% grades fully loaded.)

Big, square body opening permits loading over ends or sides by shovel, dragline, or conveyor. Dumptor pulls up, loads, drives away . . . without making a turn.

CENTRAL CEMENT FEED

prevents gumming

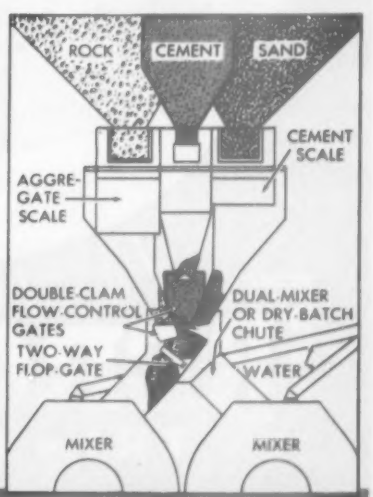
reduces dusting

pre-shrinks materials

Johnson Concentric Batcher provides these practical advantages for fast, economical weigh-batching of aggregates and cement:

- Concentric arrangement of aggregates around the cement batcher discharge gives central cement feed. This prevents "gumming", reduces dusting, pre-shrinks materials. All ingredients are intermingled as they flow through discharge.
- Cement, concrete's most expensive ingredient, is weighed individually on a precision-beam scale, in a separate batcher hung within the aggregate hopper.
- Adjustable rate of discharge on cement permits extremely accurate ribbon-feeding. Semi-automatic cement arrangement cuts off just ahead of final weight.
- Aggregates are weighed on accumulative dial scale, or on individual weigh-beam scales.
- Two-way discharge with dual chutes are available for charging 2 stationary mixers, or for charging into 1 stationary mixer and a truck-mixer, or dry-batch truck.
- Concentric Batcher sizes range from 2 to 8 cu. yds., and can be arranged for 2 to 8 aggregates — plus 1 to 4 types of cement. Choice of controls: fully automatic air-ram operated, semi-automatic, or manual, to best suit your needs.

Let your Johnson distributor show you all the other production advantages you will get with one of these patented Concentric Batchers in your plant. See him, or write to us.



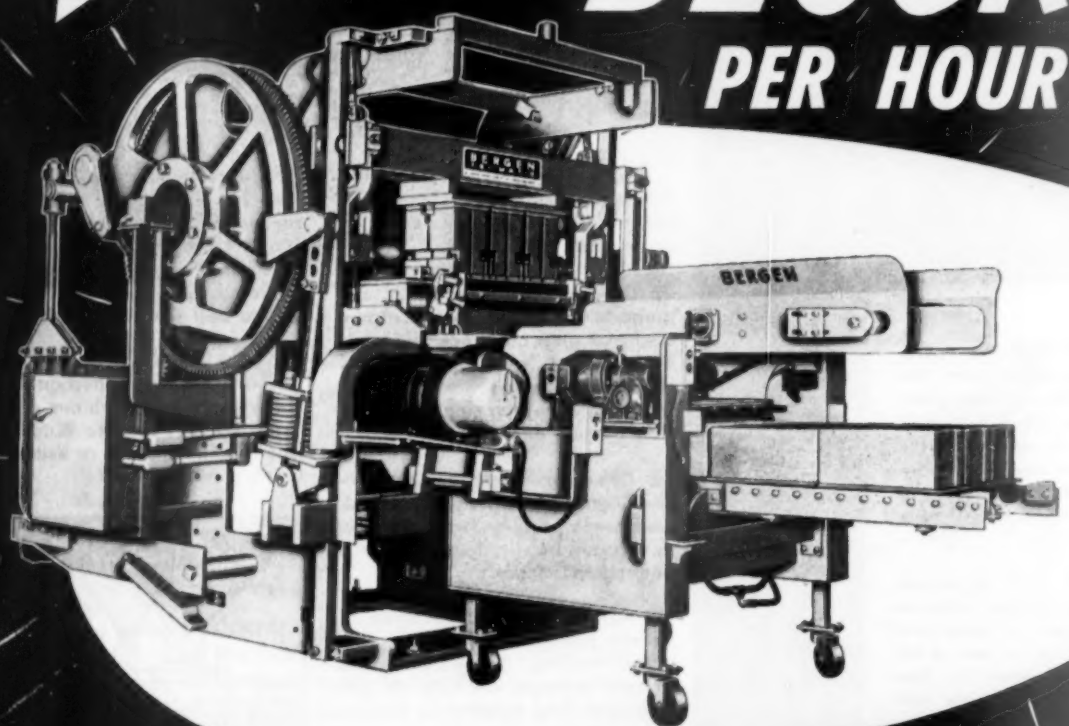
22

. . JOHNSON • PARSONS • KWIK-MIX)

(Receiving Subsidiary) C. S. JOHNSON CO., CHAMPAIGN, ILL.

CONCRETE PLANTS • BINS • RECEIVING HOPPERS • ELEVATORS • SILOS • BUCKETS

1,000 (8" EQUIVALENT) GOOD BLOCK PER HOUR



BERGEN TRI-MATIC

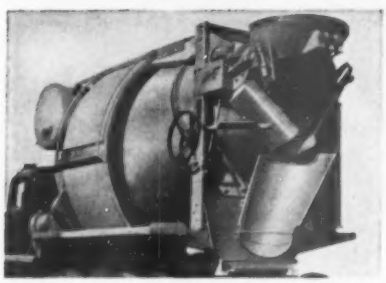
AVAILABLE 3 WAYS

- ON LEASE BASIS
- LEASE with OPTION TO BUY
- OUTRIGHT SALE

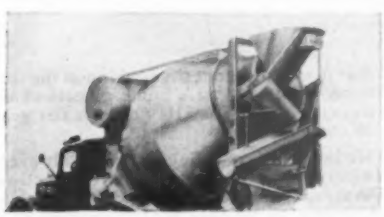
Write for literature

BERGEN MACHINE & TOOL CO., INC., NUTLEY, N. J.

Get greater payload capacity with Worthington Hi-Ups



MODEL LC—standard equipment: top hatch loading door, closed end charging door, running boards, side shields. Approximate weight—7100 lbs.



MODEL LO—standard equipment: open end drum with fixed hopper, inspection plate, no side shields or running boards. Approximate weight—6300 lbs.

In Worthington Truck Mixers, engineered weight distribution brings the center of gravity well forward of the rear axle—enabling you to carry the maximum legal payload. Scale weight is held to a minimum, with no sacrifice in strength or operating efficiency.

Rigid factory and field tests assure each Blue Brute user of trouble-free operation and low cost maintenance. All parts requiring attention are readily accessible for easy servicing.

The modern Worthington mixer is available in capacities of 3, 4½ and 5½ cubic yards, with respective agitator ratings of 4¼, 6⅛ and 7⅛ cubic yards.

Learn more about the Blue Brute Hi-Up—the truck mixer that is the ideal combination of light weight, strength and durability. Get in touch with your nearest Worthington Blue Brute distributor or write

Worthington Corporation, Concrete Machinery Division, Plainfield, N. J.

R-3-1

If It's A Construction Job, It's A *Blue Brute* Job

Should be in every BASEMENT!

● Basements as well as utility rooms in basementless houses should be protected against water damage. That means using Medusa Waterproofed Cements (or Waterproofing Paste or Powder when waterproofed cements are not available) in all concrete and mortar. These Waterproofings bring economy for the builder, satisfaction for home owners and extra profits for you.

The cost of using Medusa Waterproofings over a non-waterproofed cement is so small that it means practically nothing in the total home cost, yet assures home owners of dry basements and utility rooms for years to come.

Medusa Waterproofings are available everywhere in one of these forms—Medusa Waterproofed Gray and White Portland Cements, or Medusa Waterproofing Paste and Powder for mixing with regular portland cements. Contact your nearest Medusa sales office for further details.

MEDUSA Portland Cement Company

1000 Midland Building • Cleveland 15, Ohio

SALES OFFICES

Chicago, Illinois
Pittsburgh, Pa.
Milwaukee, Wisc.
Toledo, Ohio
New York, N. Y.
York, Pennsylvania

WHITE • WATERPROOFED WHITE • GRAY
WATERPROOFED GRAY • AIR ENTRAINING • HIGH EARLY STRENGTH • STONESET • BRIKSET
WHITE TILE GROUT CEMENT

MAKERS OF AMERICA'S FINEST PORTLAND CEMENTS FOR OVER SIXTY YEARS

A Salute to the CONCRETE BLOCK MASON

While the Concrete Block Mason is not altogether the "forgotten man", he has nevertheless failed to receive the honor and recognition to which he is entitled. Without the Mason, there would be no Concrete Masonry construction!

It is the *Mason* who translates the Block Producer's output into practical fulfillment of the purposes for which his products are designed and made.

It is the *Mason* who "brings to life" the dreams of the men and women who create, on paper, the wonderful buildings that serve as monuments to their Designers and Builders.

It is the *Mason* who carries out the instructions of the Building Contractor, laying course on course, block on block from foundation to roof. Through his labor and craftsmanship, he transforms vacant property into fine homes, commercial buildings and great public structures — adding beauty, shelter and greatly enhanced property values to all communities where he works.

It is the *Mason* who enables such concerns as the Besser Manufacturing Company to capitalize their great investments in plants and machinery — in order to provide the ultimate Masonry Units that constitute the very foundation of his trade.

And so, on this fiftieth anniversary of the Besser Era of Concrete Masonry Progress, we *salute* the Concrete Block Mason as a man among men; a doer of great deeds; a craftsman whose talents and energy bring to fruition the thinking, planning and work of Designers and Architects — to provide the means for the exercise of his labor and skill.

And by this token, too, the *Mason* has a great and continuing responsibility. He must be imbued with a pride of craftsmanship that impels him to do his work with the greatest skill and care of which he is capable. He must lay his Block true and spread his mortar uniformly, effectively and economically. He must point up his mortar joints cleanly to create, with the feel of a true artist, a structure to which he may always point with pride and say: "It is my *best* — let no man find fault with this, my work!"

And just as we, as manufacturers of Block Machinery, and the Block Plant Operator, as a manufacturer of Masonry Units, must constantly strive to *improve* on our past best efforts . . . so also must the *Mason* strive to do his work constantly better and improve on *his* past best efforts.

While no bronze plaques are placed on the buildings the Mason helps to erect, in honor of his service, he is yet a man who deserves our plaudits and respect. And for his benefit, to lighten his labor wherever possible, it is our constant aim to design and build machines which, in turn, will produce block that is easier to handle, easier to lay, and more beautiful to look at in the final creation of a building. This, too, becomes a tribute to the Mason's skill and craftsmanship.

So we Salute the Mason, wherever he may be, as the man on the "firing line" — a great man on the Concrete Masonry "Team".

BESSER MFG. CO. • ALPENA, MICH., U.S.A.

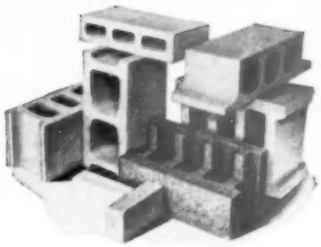
BESSER 50th Anniversary 1904-1954

...a Half Century of Concrete Masonry Progress!

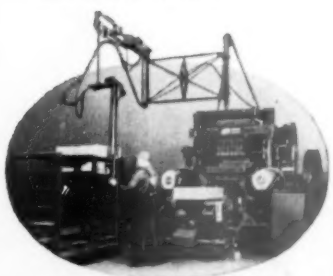
Build Better with VIBRAPAC Block

Perform Modern Masonry Miracles on Both Exteriors and Interiors

A half century of scientific progress in quality control has won universal respect for VIBRAPAC Block. The functional qualities of these Modern Masonry Units, plus their wide range of practical adaptability, have inspired the most advanced creative construction. Many years of research have paved the way for lightweight aggregate and perfected VIBRAPAC manufacturing processes. As a result, structural loads are reduced without sacrificing rugged, constructional security. Firesafety — stormsafety — insulation against heat and cold — acoustical and soundproofing qualities — low initial cost — low upkeep. All these are added advantages. Yes, you'll be proud of the modern masonry miracles you can perform with VIBRAPAC Block.



A few of the many standard modular building units engineeringly sound, architecturally beautiful, for top quality construction at low cost.



BESSER VIBRAPAC — the fully automatic concrete block machine. Produces high quality masonry units, of any desired texture and density, at the lowest possible cost.

CONCRETE BLOCK PLANTS: This is one of a series of advertisements prepared by Besser and appearing currently in *Architectural Record, House & Home, Progressive Architecture, Architectural Forum, Engineering News-Record, American Builder, Masonry Building and Practical Builder.* We hope these advertisements will help all Block Plants in developing new markets for Concrete Masonry—the modern building material.

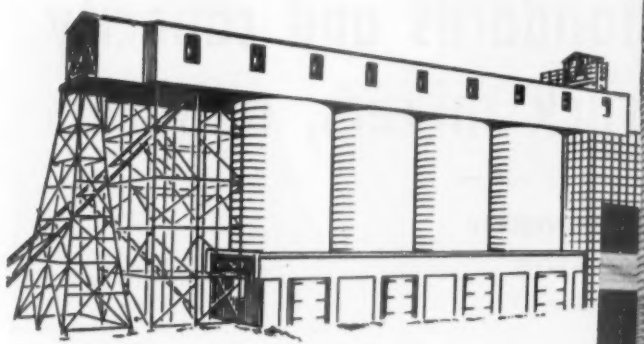
BESSER MFG. CO. • ALPENA, MICH., U.S.A.

Half Century of Concrete Masonry Progress!

Marietta

GREATEST NAME IN SILOS

lets you think in YEARS-AHEAD terms!



From foundation to roof, a Marietta Concrete Storage System is adaptable to every type of materials-handling.

Marietta engineers, thinking in years-ahead terms, have long recognized the unpredictability of the future as an important factor permanently tied to the apron strings of industry. Constructive thinking, in the past, with particular attention to this factor, has resulted in the production of modern storage systems purposely designed for immediate conversion or expansion without imposing penalties to meet any need.

There is no limit to the equipment that can be incorporated into a Marietta silo wall, roof or floor. A flexible Marietta Silo will accommodate any discharge system.

Concrete silos erected during 1916, the year Marietta ventured into the industrial storage system business, are in useful operation today, standing as undeniable tributes to the wisdom, integrity and engineering prowess which have always been fundamental characteristics of The Marietta Concrete Corporation.

Whatever you store or handle, you'll be money ahead with a complete Marietta Concrete Storage System. Write today for particulars. Catalog upon request.

THE Marietta CONCRETE CORPORATION

MARIETTA, OHIO

BRANCH OFFICES

501 Fifth Ave., New York 17, N. Y. — Hollywood, Florida — Pulaski Hwy. at Race Rd., Baltimore 21, Md.

805 Bessemer Bldg., Pittsburgh 22, Pa. — Box 1575, Charlotte, N. C.

PRECAST CONCRETE PRODUCTS FOR FARM, HOME AND INDUSTRY

3 CUBIC YARD MIXER
NATIONAL READY MIXED CONCRETE ASSOCIATION NRMCA
GUARANTEED BY MANUFACTURER TO MIX
3 1/2 CUBIC YARDS
AND CERTIFIED BY THE TRUCK MIXER MANUFACTURERS BUREAU TO COMPLY WITH ITS STANDARDS FOR TRUCK MIXERS AND AGITATORS AS APPROVED BY THE N R M C A
4 1/4 CUBIC YARD AGITATOR
UNLESS RATED LOWER ON THE MANUFACTURER'S DATA PLATE
N R M C A REGISTRY NO

New rating plate: Shows rated capacity and manufacturer's guaranteed capacity as truck mixer, and maximum capacity as agitator. Agitator rating is reduced when a lower rating is shown on manufacturer's data plate.

Announcing new standards and capacity rating plates for truck mixers, agitators

CAPACITIES IN CU. YDS. OF MIXED CONCRETE		
AS TRUCK MIXER		AS AGITATOR
Rated	Guaranteed	Maximum†
2½	3	3¼
3	3½	4¼
3½	4	5
4½	5	6¼
5½	6	7½
6½	7	9
7½*	8	10¼

*Sizes larger than 7½ cu. yds., in increments of 1 cu. yd. only, are standard when conforming to Bureau volume requirements.

†Unless a lower capacity is shown on manufacturer's data plate.

Complementing the new standards of the National Ready Mixed Concrete Association, the Truck Mixer Manufacturers Bureau has adopted revised standards for truck mixers and agitators.

These revised standards establish new mixer ratings of 2½ and 3½ cubic yards and further provide that all sizes of mixers be guaranteed by the manufacturer to mix an additional one-half cubic yard over their rated capacity. *Thus a standard mixer is now available to handle any size batch from 2½ cubic yards up, in ½ yard increments, as shown.*

The manufacturer's guarantee of ½ cubic yard additional mixing capacity provided in these Bureau standards, and the correlated requirement of 20 additional mixing revolutions in the new NRMCA standards, are based on many years of industry experience and extensive laboratory studies by both the NRMCA and individual mixer manufacturers.

These Bureau standards were approved by the National Ready Mixed Concrete Association on September 29, 1953 and became effective on that date. However, the 2½ and 3½ yard sizes become standard on May 1, 1954. New rating plates, showing both rated and guaranteed capacities, are now available from the Bureau for immediate attachment to all machines in the field which are now eligible to carry our rating plate, for sizes over 2½ cubic yards or greater. Owners are invited to make application for these plates.

The Bureau will gladly mail a composite copy of the new ASTM, NRMCA and Bureau standards, together with recommended practices for sampling and testing, to architects and engineers who wish to maintain these quality standards by incorporating them in their specifications. Address requests to TRUCK MIXER MANUFACTURERS BUREAU, 1325 E Street, N.W., Washington 4, D. C.

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MEMBER N. R. M. C. A.

One of the crowded sessions at the annual meeting

Convention Presents Plans to Promote Acceptance of Concrete Masonry

National Concrete Masonry Association convention in Washington, D. C. learns about new research and advertising program to widen markets

REGISTRATION for the 34th annual convention of the National Concrete Masonry Association, held February 9-11 at the Shoreham Hotel, Washington, D. C., was approximately 1100. This was the off-exposition year in a schedule of meetings that provides for a large machinery exposition every other year. The program sessions were devoted in a great measure to merchandising and all means to improve the stature of the concrete masonry industry in order to protect and further markets as the industry enters a competitive era.

Another feature of the program was the emphasis on the part that government plays in business, and the various papers presented by top men in important federal posts. The concluding session was devoted to papers on research and technical problems. Committee meetings were held the day preceding the open sessions as was a meeting of representatives from local, state and regional concrete masonry organizations.

There were several planned social functions, and a special program was arranged for the ladies. Member companies in the Washington, D. C., area were hosts for an evening "get-together" party that featured complementary music, dancing and entertainment. The hosts were Bethesda Mfg. Co., Inc., Cherrydale Cement Block Co., Inc., Edmonds Art Stone Co., Hudson Supply and Equipment Co., Ernest Maier, Inc., Metropolitan Block and Supply Co., National Brick and Supply Co., Inc., V. Paturzo Bro. and Son, Inc., Washington Brick Co., Washington Concrete Sales Corp. and West Brothers Brick Co.

The annual banquet featured a floor show and banquet. Ladies' functions included a luncheon and talk by Treasurer of the United States Ivy Baker Priest; also a Washington sightseeing tour and escorted tour through the White House.

Many members took the opportunity to visit Washington-area concrete masonry plants including the new, ultra-modern, high pressure steam-curing plant of National Brick and Supply Co. at Terra Cotta just outside the city.

Presiding officers for the sessions were President Sam Paturzo for the opening session; S. Carl Smithwick, vice-president elect; Otto Buehner, chairman of the promotion committee; W. R. Ireland, vice-president elect; and President-Elect M. E. Rinker for the concluding session.

New Officers

M. E. Rinker of Rinker Materials Corp., West Palm Beach, Florida, was elected president of the National Concrete Masonry Association. New vice-presidents are: R. I. Lampus, R. I. Lampus Co., Springdale, Penn.; W. R. Ireland, Birmingham Slag Co., Birmingham, Ala.; and S. Carl Smithwick, Smithwick Concrete Products Co., Portland, Ore. Carroll Strohm, Jr., Nashville Breeko Block & Tile Co., Nashville, Tenn., was re-elected secretary-treasurer. The three new directors are: R. H. Radcliff, Jr., Radcliff Gravel Co., Inc., Mobile, Ala.; Jay C. Ehle, Cleveland Builders Supply Co., Cleveland, Ohio; and E. E. Jensen, Janesville Sand & Gravel Co., Janesville, Wis.

Executive Secretary's Address

"Past, Present and Future of the Concrete Masonry Industry," was revealed by E. W. Dienhart, executive secretary of the N.C.M.A., in his address.

Left to right: E. W. Dienhart, executive secretary; the Most Rev. Patrick A. O'Boyle, archbishop of Washington, D. C., who gave the invocation; Sam Paturzo, president and Hon. R. F. Camalier, Commissioner, District of Columbia

M. E. Rinker, left, newly elected president with Sam Paturzo, outgoing president

Over 57 percent of the total volume of the concrete block production is used for non-residential building, approximately 11.2 percent being used for schools. The acoustical properties make block adaptable for use in hospitals, churches, and other institutions. The remaining percentages, he said, were 37.3 for residential and 4.8 for government, the later category including 3.1 for public housing.

In anticipation of keener competition, Mr. Dienhart said the industry would meet it by two methods; by an increased advertising budget of 50 percent; and an increase in the activities of the engineering department.

Promotion-Technical Aspects

In his opening remarks, Theodore Leba, Jr., manager, Washington office of N.C.M.A., invited the members to make themselves known to him during the convention so that he might better understand their individual problems and give any possible assistance.

A most important activity of the Washington office is the dissemination of technical information on the proper way to use concrete masonry in the design of structures for both government design offices and private architects employed by the government.

Mr. Leba said that there are well over 40 separate government design offices in Washington, and the Corps of Engineers alone contains well over 300 architects and engineers under contract.

There are 21 different types of military structure designs to be used at army posts throughout the country. These designs have been specified by the Corps of Engineers to have wall structures of concrete masonry units, in every case.

The most effective promotion can and is done when a design project is on the drafting board. At this time, he said, control joint locations, the amount of joint reinforcement, and the placement of bond beams can best be evaluated.

Continuing, Mr. Leba said the past year has noted the growth of the Chief Engineers' manual on Requirements for Concrete Masonry Construction, from an idea to the reality of its publication for distribution to government agencies and their design offices. A limited number of these copies were available to interested members at the end of the program.

The importance of this manual to the industry, he explained, was that it establishes the limitations to which concrete masonry may be put, the application of reinforcing steel to prevent cracking, and the limitation of moisture content, which, he pointed out, was lower than that established by federal specifications; namely, 30 percent instead of 40 percent.

Producer-Contractor-Mason Cooperation

"Opportunities for Expanding the Use of Masonry Products in Construction Through the Cooperation of the Bricklayer, Mason Contractor and Concrete Products Manufacturer" was the topic covered by John Murphy, secretary, Bricklayers, Masons, Plasterers International Union of America.

It would be of benefit to all three groups, he said, to cooperate to promote the masonry program. Each group he pointed out was interdependent upon the other to some extent to further its separate program.

By keeping pace with new building trends and technical developments and giving the masonry contractor and the masons more information would further their knowledge of the manufacturers product and aid in an extended program.

By developing a greater diversity and better product, the manufacturer makes it possible for the brick layer and mason contractor to offer better building practices and a greater variety of architectural designs.

Architect Competitions

In a joint address Earl W. Peterson, Nebraska Concrete Masonry Association and H. J. Stockard, Jr., North Carolina Concrete Masonry Association, told about "The Practical Benefits Obtained by Sponsoring Architectural Competitions in Residential Construction."

The North Carolina contest, Mr. Stockard, Jr. said, attracted 62 eligible entries from architects, students and draftsmen residing in the state. The prime purpose of this type of competition was not merely to pick out a particular type of design or architect, but rather to encourage improved design of low-cost houses.

This competition, he continued, tends to apply the value of trained architectural effort to bring modern home design within the financial range of the largest segment of the home-seeking public, the limited income group, and also to create public interest for further design services of the architect.

Speaking for the Nebraska Concrete Masonry Association, Earl W. Peterson of Omaha, Neb., said the most important benefits would be derived from the home design competition because the architects entering the contest would of necessity have to acquire a greater knowledge about concrete masonry construction. This would result in more house plans specifying concrete masonry, and familiarity with the product would promote better designed structures.

Modular Coordination

William Demarest, Jr., secretary for Modular Coordination, American Institute of Architects, summarized the value of modular coordination to the industry and its application to construction cost reduction. He said that architects are much in favor of modular sizes of concrete masonry units and other building products, and that their use results in substantial cost reductions, and is an effective approach to widening markets.

Hon. Douglas McKay, U. S. Secretary of the Interior, a native of Oregon, was introduced by S. Carl Smithwick, Portland, and presented an excellent address on activities of his department and efforts of the administration to improve the national economy. In his comments about the national debt, he said that the interest alone amounts to $6½ billion dollars annually or $40 per person. Mr. McKay reminded that there are many loyal and conscientious workers in government service who deserve commendation, and that a great number of workers are not in the category that warrants the kind of criticism that has been made by those who are uninformed.

Members of National Concrete Masonry Association staff. Left to right: Wm. Markert, R. E. Copeland, Ted Leba, Jr., Evelyn J. Bouet, E. W. Dienhart, and E. Mangotich

Douglas McKay, Secretary of the Interior, one of the speakers

W. Stanley West, president, W. M. West & Son, Inc., Cleveland, Ohio, gave a talk entitled "A Mason Contractor's Approach to the Application of Cost Reducing Methods on the Job" which he illustrated with colored slides showing special equipment developed to step up the efficiency in handling building products on the jobsite. His theme revolved about the necessity for suppliers and contractors working together to lower building costs and improve quality of construction.

He emphasized how masonry materials are being faced with increasing pressure from substitute building materials. As an example of the challenge, he gave some figures to show the small percentage of the low-cost housing market dollar that is going to masonry materials. As an example, he pointed to a typical $12,000 home, for which less than $60 went for masonry materials.

In the field of public works the situation is much better, he said, but he pointed to the growing inroads of competitive materials in that class of construction. He mentioned the new Alcoa and U. S. Steel Corp. buildings in Pittsburgh, Penn., which were built of materials with "glamour" but he believes that tiltup and sandwich wall methods of construction are much more significant competitively. Safety, appearance, durability and cost are the determining factors in selection of type of construction, he said.

He pointed up the need for the masonry producer and contractor working together to the end of lowering costs to parity with inferior substitute materials. In that respect, he believes that low-cost material handling at the job can make important contributions.

The "West" system which he described and illustrated consists of the use of special equipment to handle brick in packages, which he thinks adaptable to handling concrete units. In handling brick they come in a packaged unit measuring 24 x 30 in. and fork lifts are used to unload and stack them in neat piles at the job. Tractors used for handling are designed to travel over rough ground, muddy or not, and they place the brick on the contractor's pallets. The same tractor transfers the brick to the elevator, if used, or directly on to the working elevator if it does not exceed 22 ft. in height.

The packages are handled at the working level by a 3-wheeled, pneumatic-tired "brick buggy" which is very maneuverable and which loads itself in six seconds and unloads in two seconds. On large jobs, savings in the range of 10-20 percent in the cost of masonry are so realized according to Mr. West. He believes the practice would result in economies for all types of building. The system has not been tried for single houses.

William F. Nelson, president of the Mason Contractors Association of America, who has appeared as a speaker at several recent N.C.M.A. conventions, told how the masonry contractors as a group have approached the problem of expanding markets for masonry construction through lowering construction costs. Mr. Nelson suggested that a joint committee be set up with representatives from the concrete masonry industry, the mason contractors, and the union to work together for the advancement of the masonry industry. He is strongly in favor of palletized handling and other methods to lower costs and sees the need for cooperation in developing new handling equipment and in improving relations with the general contractor.

Merchandising

"N.C.M.A. Plans for Maintaining and Expanding Markets Through Increased Promotional Activities" was the subject of a talk by W. P. Markert, director of promotion, N.C.M.A. His talk covered the expanded program of public relations, publicity, advertising and sales promotional tools planned by N.C.M.A., to be used nationally and at the local level to maintain the great gains of the industry during the last decade. It was

William Demarest, Jr., secretary for modular coordination, A.I.A.

covered in all its phases, but we omit details herein because they were covered in an illustrated article, "Concrete Masonry Industry Enters a Competitive Era" published in the January, 1954, issues of ROCK PRODUCTS and CONCRETE PRODUCTS

Mr. Markert pointed out that government and private forecasts estimate that the construction industry will have its second highest volume in 1954 with a very slight reduction from the 1953 all-time record. He also said that the promotional program which he described is intended to be expanded further. He reminded that concrete masonry exteriors were still far down on the list in preference surveys, for home construction, which indicates a large potential market to be developed.

Part of Mr. Markert's presentation was a playlet using live actors, slide films and sound effects to dramatize the market picture and the industry's opportunity in the residential and non-residential construction fields. It played up expanding markets in the various categories and situations as they are today which are bound to reflect in high construction volume.

The advertising part of the promotional campaign includes a heavy

Three new directors, left to right: R. H. Raddiff, Jay Ehle and Ellis Janson

G. Yates Cook, director of housing rehabilitation, N.A.H.B.

schedule of insertions in selected media which were illustrated by slides, and Mr. Markert emphasized that the entire promotional program is keyed for effective use at the local level.

Frank Erskine, managing director of the Expanded Shale Institute, discussed the activities of his organization and their value to the concrete masonry manufacturer. He first discussed the place of lightweight aggregate for load-bearing concrete in modern building and outlined the growth of the Expanded Shale Institute. It was organized in May, 1952, by 12 producers having a total of 13 plants. Now there are 24 plants in 15 states represented.

The organization is highly promotion-minded, and is actively conducting research on the performance of concrete made from members' aggregates. The research is underway at Toledo University. Mr. Erskine told how the use of lightweight expanded shale concrete can reduce dead weight in structures by as much as 30 percent without sacrifice in strength.

Use of the Institute's publication "Concrete Facts" in promotion was described. Technical studies are being made on the use of lightweight shale aggregates in prestressed concrete which is looked to as an important field for market development. The Institute intends to publish the results of the performance studies being made at Toledo University which, Mr. Erskine believes, will prove of benefit to the concrete masonry industry.

Slum Clearance

One of the most interesting talks of the convention was by C. Yates Cook, director of Housing Rehabilitation, National Association of Home Builders, which pointed out how the prevention of spread of blight in cities afforded an attractive opportunity for a replacement market in building construction. The title of his paper was "Slum Clearance—The Baltimore Plan," but he deviated from that designation to cover the subject nationally which he illustrated with slides showing typical run-down homes and what can be accomplished.

Mr. Cook is seeking the support of local business and civic government leaders throughout the country for a campaign to provide better housing for middle and low-income families. Failure to do so, he said, will mean that the entire economy founded on the city concept is threatened. In fact, he mentioned that serious thinkers are talking of abandoning our present cities as already beyond salvage. The movement of people outside of cities is eating away the tax base of the cities, and businesses are following, leaving only the poor behind in cities spreading slums.

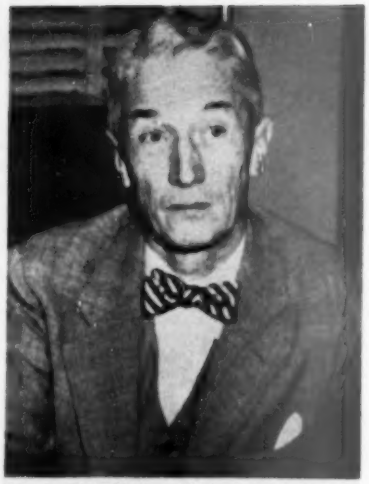
He decried the living standards of the poorer classes and the lack of adequate health facilities. The problem, he said, concerns the whole community and not just those directly affected and it involves a change in attitude. The three tools which are needed to fight the situation, he said, are the support and participation of industry, credit improvement for existing housing, and political endorsement at the federal, state and municipal levels.

Governments came in for criticism and for failure to administer laws already on the books. To show what can be done, he pointed to what the Department of Housing Improvement has done in New Orleans where an entire street was rehabilitated through the help of local businesses. The Baltimore Plan has restored 18,000 slum dwellings at a cost to the city of only a fraction of a cent per capita. Potential markets through such rehabilitation would maintain the nation at a war production level for 15 years, he said. Also, low income people, when their homes are improved, will take a renewed interest in improving their lot through purchases of needed improvements.

F.H.A. Aims

Guy T. O. Hollyday, commissioner, Federal Housing Administration, pre-

Walter Williams, Under Secretary of Commerce, one of the speakers



Guy T. O. Hollyday, F.H.A. Commissioner, a speaker at convention

sented the aims of the F.H.A. in a talk entitled, "A New Look at F.H.A." He said that the purpose of recently announced changes is to bring the agency's programs and procedures into line with current needs and modern practices. The agency is constantly exploring the possibilities of a greater contribution through new construction techniques, he said.

According to Mr. Hollyday, new construction as such is too often thought of in evaluating market needs whereas there are more than 40 million existing houses where maintenance and improvement add up to a tremendous potential for the home building industry.

It is expected that a new legislative provision in process may make it possible through F.H.A. for banks to make loans for slum clearance. The big market for builders is among the lower income group, he said.

Looking ahead, he believes that 1954 will be a good year for building if there be interest in seeking business.

Government Program

W. R. Ireland, vice-president of N.C.M.A. introduced Hon. Walter Williams, Under Secretary of Commerce, who spoke on the "Commerce Department's Program for Aiding Small Business."

Mr. Williams expressed his surprise on learning that last year's output of concrete masonry, in 8-in. equivalent units, totalled 1,850,000,000 building units.

In looking to the future for construction materials, he believed we can expect a favorable situation to continue.

Some of the changes in government-business relations were listed by Mr. Williams as follows: (1) it is recognized that the government represents our entire nation and the welfare of business and the other segments of our economy are interdependent; (2) government-business relationship

Carroll Strohm, Nashville, talking things over with President M. E. Rinker

must be directed toward the same goals; (3) in defining these mutual goals and striving to attain them, government and business must consider the individual rights and public good; (4) acknowledgement by both government and business that each has responsibilities to discharge in the interests of the other; (5) both government and business must accept a flexible relationship and capability of dealing with our economy and ever-fluctuating impacts of world-wide economic and political factors; (6) to fulfill all these aims and achieve the relationship between government and business will provide the greatest stimulation to progress and require the exercise of the highest level of economic statesmanship on the part of each. Mr. Williams concluded by saying that with a recognition of interdependence, and acceptance of common purpose and mutual goals and with a full understanding and trust, government and business working together can fulfill its responsibilities to each other.

Panel Discussion— "What Would You Do?"

A panel discussion was arranged by John W. Mock, Business Management Consultant, Director, with the subject, "What Would You Do?"

Mr. Mock selected a group comprising association members to portray various business men and problems confronting them. The panel included: Tip Brown, Kansas City, Mo.; Harvey Kilmer, Des Moines, Iowa; Ernest Barnes, Knoxville, Tenn.; Garson Dinaburg, Binghamton, N.Y.; Noel Harter, Tulsa, Okla.; and Phyllis Kellinger, Washington, D. C.

With this cast portraying business men, situations were developed with the question, "What would you do?" being asked the audience. Some of the typical situations brought up by the panel follow: A contractor calls in that he will be out of block in one hour and requests that block be sent to the job immediately. You have only green block on hand. "What would you do?" Send green block? Get them elsewhere? The best answer indicated the proper approach was to take your own block from another job and deliver to the distressed contractor.

Another situation involved this problem. Your truck driver calls in and states that the contractor required him to carry block from truck to a position at the job site, a distance of 600-ft. from the truck. "What would you do?" The best answer selected was: "You should have a written policy explaining your delivery procedure and policies thereby eliminating this situation." Numerous other problems were discussed by this panel of business executives.

Control Joints

"Design and Construction of Control Joints in Concrete Masonry Walls" was the subject of an excellent paper by C. A. Sirrine, executive secretary, Concrete Products Association of Michigan.

At the outset, Mr. Sirrine said that it was the responsibility of the designer, the builder and the concrete masonry manufacturer to promote the best interest of the building industry through sound design, sound materials and correct construction. Many manufacturers of concrete products, he said, have not given recognition to problems of the designer and builder in making the best use of concrete masonry. He emphasized that there are important promotional values tied to technical research and development.

Outgoing President Sam Paturzo shows off his "cast stone" foot at the party held at his home for N.C.M.A. officers and directors

In Michigan, he said, actual experience has shown that control joints in concrete masonry walls, where properly designed and used, pay good dividends in the form of satisfactory jobs. And, he emphasized, there is no better promotion than a satisfied customer.

Cooperative action has been required in Michigan, said Mr. Sirrine, to obtain properly designed and built control joints, involving much educational work, because there has been inclination to blame the producer when concrete masonry walls start to show signs of improper construction. The designers had to be sold on using control joints where such practice is needed, which involved providing them with sound and workable information at every opportunity.

In Michigan, one of the jobs was to convince the designers that the use of high pressure steam-cured units did not make unnecessary the use of control joints. Another obstacle was to convince designers that horizontal wall reinforcement is not to be used in place of control joints, because each has a separate function and both are recommended for specific purposes.

There was some resistance because the designers feared adverse effects on appearance through use of control joints but this was disproved. A slide was shown of a school built in a suburb of Detroit, using control joints to emphasize that such joints do not detract from appearance. The contractor's estimate did not contain one penny extra for control joints and no extra cost was incurred in installation. The only extra cost was an almost negligible item for materials. Where furring and plastering is required on a wall with control joints, it is agreed that the plaster should be cut at the joint and some type of metal beading be used which might be painted in with the rest of the wall.

Edward Mangotich, assistant engineer, N.C.M.A., reported on recent tests on the curing and drying of concrete block. His talk contained much data which will later be published in the form of a technical report to be mailed to N.C.M.A. members.

Regional Meetings

In order to coordinate the activities of the N.C.M.A. and the many local, state and regional groups that have sprung up over the country, seven leaders of the national association and a half dozen secretaries from associations over the country met the day before the convention. Their chairman was Philip Paolella, Plasticrete Corp., Hamden, Conn. The joint committee progressed to the point where only a few differences were left to be ironed out in a program of welding the organizations into a closely knit unit.

Harold Speight, Cedar Rapids, chatting with Morland Clark, Idaho Falls

M. E. "Doc" Rinker, president, and his charming wife at the officers and director's party

The meeting was followed by a dinner at which a number of guests were invited to attend, and which paved the way for an evening of enthusiatic reporting of an ever widening effort to include all elements of the industry into working units to broaden the market. W. P. Markert, director of promotion, National Concrete Masonry Association, Chicago, presided and with him at the speaker's table were Chairman Paolella, incoming N.C.M.A. president M. E. "Doc" Rinker, E. W. Dienhart, executive secretary of N.C.M.A., and 1953 president Sam Paturzo.

First-hand reports of architectural contests for outstanding designs of concrete masonry houses conducted in various parts of the country were given by representatives from Michigan, Nebraska and North Carolina. Wisconsin announced that a similar contest will be under way shortly following a successful year of newspaper, radio and other media of establishing consumer interest and acceptance of concrete masonry uses.

A report from D. E. "Don" Jordan, sales manager, Layrite Concrete Products, Seattle, Wash., drew close attention as he related the successful operation of a local Seattle group known as The Unit Masonry Association. The membership starts with union participation of brick and block layers of which there are approximately 500 in the area. They subscribe 40 cents per month which is added to their monthly dues. The masonry contractor pays $2.00 for each mason employed during the month and the members from the material firms match the amounts so raised. The full potential is around $2400 per month although this varies with area building conditions. Monthly meetings are held in which the entire industry discusses mutual problems affecting the future of masonry as well as to carry on a continuous program of promotion under the direction of an experienced agency. Display newspaper advertising has been used with good effects in bringing public attention to local masonry jobs of excellence in design and construction. A prize contest for architectural house designs of masonry is just getting under way.

The special committee met again at a complimentary breakfast by Chairman Paolella, and will continue its work and meet again in July preceding the meeting of N.C.M.A. directors in Asheville, N. C.

Prefabricated Concrete Masonry Wall Panels

George E. Adams, Adams Concrete Products, Ypsilanti, Mich., presented an interesting paper on "Large Scale Use of Prefabricated Concrete Masonry Wall Panels," which he illustrated with slides showing the assembly.

In pointing out some facts relative to a comparatively new idea in the prefabrication of masonry wall panels, Mr. Adams said his remarks were preliminary conclusions.

Acting as a sub-contractor on a job which furnished and erected approximately 100,000 sq. ft. of prefabricated masonry panels, Mr. Adams showed that by the use of this prefabricated panel system there was a saving of 5 sq. ft. of floor space per room.

Five other advantages were outlined by Mr. Adams: (1) panels may be manufactured while preliminary foundation work is in progress; (2) installation not hampered by weather, and requires only a small crew; (3) the operation becomes an assembly job with resultant savings in cost and elapsed time in construction; (4) basic unit is made on a standard block machine; (5) masonry panel is made up of a multiple of machine made units and variations in design can be accomplished without expensive forms. These factors, he concluded, make this system a highly desirable method of construction, and he urged producers to investigate possibilities.

Geo. W. Katterjohn preparing to take some movies at the officers and directors party

Reinforced Concrete Masonry

"Fundamental Research on the Structural Behavior of Reinforced Concrete Masonry," was the subject of a technical paper by Jesse C. Saeman, University of Wisconsin.

In recent years, said Mr. Saeman, a variation in concrete masonry construction has been introduced that permits resistance to bending stresses; that is, the addition of grout fill and steel reinforcing.

The increasing use of reinforced concrete, he pointed out, may be attributed to the following advantages: Structural members constructed in place eliminate heavy hoisting equipment and permit flexibility; concrete block construction requires no watertight forms; masons perform all the work; material may in most cases be obtained locally; reinforced lintel beams and masonry columns present a pleasing appearance; and reinforced masonry construction is as good as or better fireproofing than most other types of construction.

Following is the result of tests on reinforced concrete masonry beams:

Cross-Section in.	Steel, percent	Span, ft.	Design Load lb.	Ultimate Load, lb.
8 x 8	1.8	4	4,400	21,600
8 x 8	1.2	12	1,700	4,300
8 x 8	1.8	12	2,000	7,300
8 x 16	1.8	8	10,500	43,300
8 x 16	1.0	20	5,800	13,400
8 x 16	1.8	20	7,100	25,600
12 x 16	1.1	20	10,100	24,600
12 x 16	1.7	20	11,500	42,300

This research project was undertaken to provide the association with information for the development of design theory and proper construction procedure in using reinforced concrete masonry. The intent of this report, he continued, was not to present detailed test results but rather to outline the testing procedures followed.

The first stage of the program was to test the individual constituents. The sand and gravel concrete block which were used exclusively in the series of tests indicated an ultimate compressive strength of 3500 to 4000 p.s.i., based on net area, and 2000 to 3000 p.s.i. based on gross area with a stiffness of about 3,000,000 p.s.i. for the structural members under test. The reinforcing steel showed a yield point of 45,000 to 60,000 p.s.i., depending on the size of bar used.

Because of the numerous different constituents, including masonry units, mortar, concrete grout, and steel, bond stresses become very important. Therefore, the next step in the program, he said, was to determine ultimate bond strength.

Two types of tests were developed, Mr. Saeman said, to determine ultimate tensile bond strength between mortar and masonry unit: (1) the direct tension test wherein two blocks were mortared together and then pulled apart; and (2) an eccentric bond test in which two blocks are mortared together end to end and then broken apart by an eccentric load. Tensile

(Continued on page 178)

NEW MACHINERY

Mixer Power-Take-Off

COOK BROS. EQUIPMENT CO., 3334 San Fernando Rd., Los Angeles 65, Calif., has announced the incorporation of power-take-off on the 3- and 3½-cu. yd. sizes of Challenge truck mixers. This feature permits full, legal-rated payload capacity on a short-

Truck mixer of 3- or 3½-cu. yd. capacity, available with power-take-off

er wheelbase on standard or cab-over-engine trucks. The power is taken from the truck transmission, and provides easy gear shifting while the truck is in transit. The power-take-off has a high and low gear which provides a wide range of operating and discharge speeds. Load charging and discharging is controlled from either the normal position at the rear of the mixer or from the driver's position in the cab. The complete mixer unit, including the power-take-off is ready to install, on any new or used truck, with no other auxiliary mechanisms to install, service or maintain.

Reinforced Abrasive Blade

ROBERT G. EVANS CO., 6315 Brookside Plaza, Kansas City 13, Mo., has brought out reinforced abrasive masonry saw blades, under the name Target "Safety-Blades." The blades are said to withstand severe flexing, side pressures, and bumping while in operation. A variety of specifications are being manufactured to provide fast cutting of brick, stone, concrete block, tile and refractories. The cutting action is claimed to be extremely free and fast, with the added feature of long life. The features are the result of the blade design which has a molded strong center core of strongly woven synthetic fabric.

Concrete Masonry Coating

LOWZBCO, INC., 1525 East 53rd St., Chicago 15, Ill., has introduced a moisture-resistant, rubber-base, white coating for concrete block exteriors, stucco and asbestos shingles. The product, "Oncrete Asbestos Stucco Coating," may be sprayed, brushed or rolled on, covering approximately 300 sq. ft. with one gallon. The coating is said to resist fungus, acids and industrial fumes and seal against moisture and dust particles, expanding and contracting with climatic changes. It is also said to be 99 percent free of oils and driers, adhering to concrete and porous masonry surfaces without breaking down.

Portable Batching Plant

SOUTH EAST READY MIXED CONCRETE CO., 6400 S. Holiday Blvd., Salt Lake City, Utah, has introduced the "Travel Batcher" portable batching plant designed to load truck mixers at the job or plant site, and eliminate the need for truck mixer hauls to and from the job. It has built-in scales for weighing batches up to 20,000 lb. at one time. The low hopper design permits dump trucks to discharge into it and transfer the

Batcher loads truck mixer at job site, to eliminate need for long hauls

batch to a truck mixer. The batcher may be loaded from stockpiles with a front-end loader, or it can also be loaded from bins. On jobs where greater yardage per hour is required, bins can be placed around the batcher, and may be filled with a front-end loader which can discharge 14 ft. high. The bins hold 8 cu. yd. of sand, 12 cu. yd. of gravel in two sizes, and 250 sacks of bulk cement if desired. Due to the size and light weight, the bins are said to require about one hour for erection by two men using a front-end loader or boom truck. Larger bins can also be supplied.

The batcher can also be used to elevate about 3 cu. yd. of wet concrete at a time, to a height of 12 ft. By adding a special hopper at the back end of the batcher, concrete can be elevated over 20 ft. high, and with chutes added, it is said to permit pouring in hard-to-reach places.

If batching plants are already established at the material source, the portable batcher may be used as a transfer unit, transferring loads from a dump truck to the truck mixer at the site.

Hammermill Crusher

PRASCHAK MACHINE CO., Marshfield, Wis., has introduced a hammermill crusher which handles gravel screenings, cinder clinkers and other lightweight aggregates. The main body is made of heavy plate metal, welded into a solid unit, with replaceable wearing surfaces, and steel liners. A material hopper is provided at the top of the unit for raw material feeding by hand shoveling, conveyor, etc. The crusher capacity is approximately 20 cu. yd. of cinders or similar material per hr., depending upon the dryness of the material.

Power Wheelbarrow

KWIK-MIX CO., 3029 W. Concordia Ave., Milwaukee 16, Wis., has announced the addition of safety and performance features to the Moto-Bug, a power wheelbarrow which can be converted to a flat bed or fork lift truck. A "dead man" internal expanding brake system has been added to instantly stop machine movement when the operator's foot is off the treadle. On the fork lift version, soft-core rubber tires have been added to eliminate the possibility of punctures and blowouts. These are optional for use on other types.

A cog-type V-belt of rayon cord construction is furnished for more efficient power transmission from a 6-hp. gasoline engine to the drive wheels. The cog design aids in reducing belt stretch and slippage. An inspection door has been added to the front panel of the cowl, and the rear of the engine is open to allow inspection of the power plant from both sides.

Fork lift design and power wheelbarrow have "dead man" internal expanding brake systems

President Herbert G. Jahncke, presenting Stephan Stepanian with an honorary life membership to the board of the N.R.M.C.A. Mrs. Stepanian is seated to the right

National Ready Mixed Concrete Association discusses ways and means of maintaining sales volume. Mixer standards and specifications are important topics on program at convention

Booming Ready-Mix Industry Establishes All-Time Attendance Record

THE 24TH ANNUAL CONVENTION of the National Ready Mixed Concrete Association, held simultaneously with the 38th annual convention of the National Sand and Gravel Association, February 15-19, in Chicago, Ill., featured four separate sessions and five joint sessions with the N.S.G.A.

Many of the reports, papers and discussions on subjects of interest to both industries are reported in coverage of the N.S.G.A. meeting presented separately in this issue of ROCK PRODUCTS. The convention was featured by the largest and most successful machinery exposition in history.

New Officers

Robert C. Collins, Warner Co., Philadelphia, Penn., was elected president of N.R.M.C.A. to succeed Herbert G. Jahncke. Vice-presidents elected were Louis C. Schilling, I. E. Schilling Co., Miami, Fla., and Robert Mitchell, Consolidated Rock Products Co., Los Angeles, Calif. John W. Roberts, Southern Materials Co., Richmond, Va., was elected treasurer.

Elected to the executive committee were F. E. Schouweiler, Old Fort Supply Co., Fort Wayne, Ind.; Murray S. Simpson, Super Concrete Corp., Washington, D. C.; W. J. Hicklin, Jr., Capitol Concrete Co., Jacksonville, Fla.; and Frank Penepacker, Ready-mix Concrete Co., Portland, Ore.

Elected to the board of directors were E. K. Brown, Duluth, Minn., and E. F. Lewis, Greensboro, N. C. (1 year); R. J. Hummel, Chicago, Ill., and G. W. Garrett, Kansas City, Mo. (two years); and John Donovan, Springfield, Mass.; F. Redmond, Los Angeles, Calif.; Ralph H. Anderson, Columbus, Ohio; Henry J. Brown, Oshkosh, Wis.; W. H. Day, Jackson, Miss.; A. N. Kelso, Galveston, Texas; Murray Simpson, Washington, D. C.; and F. R. Smith, Reno, Nevada, for three years. The board of directors was increased by eight members.

Stepanian Honored

One of the highlights of the conventions was the presentation to Stephen Stepanian of a certificate of honorary membership for life on the board of directors of the National Ready Mixed Concrete Association. The board had unanimously adopted a resolution to that effect and included an honorary life membership in the association at its semi-annual meeting in Colorado Springs on September 29, 1953. That resolution was signed by the president of the association, Herbert G. Jahncke, and all members of the board and was bound in a leather volume for presentation by Mr. Jahncke to Mr. Stepanian at the joint luncheon February 17.

Robt. C. Collins, The Warner Co., newly elected president of N.R.M.C.A.

In accepting the presentation, Mr. Stepanian expressed his great appreciation for the honor. In commenting on his invention of the rotary truck mixer, he said that he received no profit from that as such but that he was happy to have observed the phenominal growth in use of such equipment over the years. He considered his contribution to the industry but a partial payment for the privilege of having the freedom of opportunity he has enjoyed in this country.

Mr. Stepanian told how he was born, raised and educated in Constantinople, Turkey, of Armenian parentage, and traced the events leading to his coming to the United States. It was through a contact made as an interpreter for Cook's tours that he came to Columbus, Ohio, to work for Jeffrey Manufacturing Co. where he invented many mechanical devices over a 10-yr. period.

Through Mrs. Stepanian's cousin he became associated with the sand and gravel industry. His idea for mixing concrete in transit came from observation of dump-truck haulage of sand and gravel which was new in those days. Patent claims for a transit mixer were filed in 1916 and they were rejected; yet, he was ten years ahead of time because it was in 1930 that truck mixers came into existence in small numbers.

Mr. Stepanian then paid tribute to the industry for its tremendous growth and accomplishment and to both associations. He is a past president of N.R.M.C.A., was first president of the Ohio Ready Mixed Con-

crete Association and had served since as its "perennial" treasurer.

President's Address

Herbert G. Jahncke, presiding officer and president of N.R.M.C.A., opened the convention session with his address in which he outlined the important position of the ready mixed concrete industry, pointing out that last year it produced 50,000,000 cu. yd. of concrete worth over one-half billion dollars. Eighty percent of that total was produced by members of the national association, he said. During 1953, 72 active members and 14 new associate members were added to the rolls. The industry used about 71,000,000 bbl. of portland cement yearly, but he pointed out that some portland cement was being sold direct to contractors and job mixed. He said that when controls were removed some cement companies raised prices and this pinched some ready mixed concrete producers. Mr. Jahncke reviewed the strike situation as it has affected the industry, and emphasized that a united front by members of the association had improved affairs. He said that in many cases the unions have driven a wedge between the company and the employes and that personal loyalties must be recaptured. He thought this was not hard to do as many members of unions pay their dues grudgingly and do not attend meetings. The speaker outlined the accomplishments of the engineering laboratory; standards revised on mixer and agitator trucks so that more concrete can be carried by a vehicle which stemmed from studies made by the engineering staff. Mr. Jahncke said that re-negotiations of contracts related to ready mixed concrete producers have no valid basis for discussion, pointing out that ready mixed concrete is a material competitive between individual companies as well as competitive with contractor's job-mixed products.

A resolution was adopted increasing the number of directors from 18 to 24.

Safety Awards

Safety awards were presented to the following companies: Fischer Lime & Cement Co., Memphis, Tenn., received the *Pit and Quarry* trophy for Class A (more than 100,000 cu. yd.) with W. S. Walters, director of safety, accepting the award for his company. The Class B trophy went to Stewart and Nuss, Inc., Fresno, Calif. (50,000 to 100,000 cu. yd.), with E. L. Howell accepting. The Class C award (less than 50,000 cu. yd.) went to The Beckley & Meyers Co., Springfield, Ohio, and was accepted by Russ Mumford.

Mr. Walters spoke briefly for the Fischer Lime & Cement Co., pointing out that his company for the second consecutive year had won first prize and gave much of the credit to top management who actively participate in safety work. Chas W. Stewart, of

Winners of Pit and Quarry safety awards, left to right: W. S. Walter, Fischer Lime and Cement Co., Memphis, Tenn., Class A; E. O. Harwell, Stewart & Nuss, Inc., Fresno, Calif., Class B; Russell Mumford, the Beckley & Myers Co., Springfield, Ohio, Class C

Stewart & Nuss, Inc. outlined the position of his company with respect to safety. He said they had evening meetings with refreshments being served, films were shown, and at times police officers addressed the group. Each year prizes are given with trophies ranging from $50 in cash to radios, wrist watches, etc. for individual safety performances. "Accident-free" cards are given to employes who earn them, and these cards have helped men get jobs at other plants, it was pointed out. Mr. Stewart said that last year 48 of his drivers had no accidents and in a tri-state contest (California, Oregon and Washington), a "Driver for the Month" was a Stewart and Nuss, Inc. employe. Russell Mumford, Class C winner, said his company operated 20 trucks and four passenger cars. Employes attending safety meetings were paid the hourly rates. Traffic films were shown and refreshments served at these 2-hr. meetings. His company received substantial insurance adjustments favorable to his company.

Civil Defense Forum

AT THE OPEN FORUM ON CIVIL DEFENSE, Frank P. Spratlen, Jr., outlined the nation's needs and the extremely important part that members of the ready mixed concrete industry should take in this civic activity. Rarely in the field of convention reporting do we find something that is really new, and if it is new, more rarely does the subject touch the lives of all people. It was easily apparent that in any future war directly affecting the cities of our homeland, the ready mixed concrete truck may be the most important vehicle as it will carry water to help extinguish fires, for domestic and drinking purposes, and for hospitals. This idea and its general development came from the fertile brain of Mr. Spratlen.

To help demonstrate the practicality of the subject, Chairman Spratlen set the stage by first introducing Lt. Gen. Henry L. Larsen of the Marine Corps who is head of the Colorado Civil Defense Agency.

Our problem, the speaker said, was one of water supply and he outlined the need for more fire fighting equipment built around our present mobile units. Plans must also be developed how to save, mobilize and use nearby equipment.

General Larsen outlined a program for the ready mixed concrete operators to work out in conjunction with their own local fire departments and civil defense organizations. He said that the mixer truck was an ideal piece of equipment to haul water. It was of big capacity, and units were usually dispersed outside of fire areas. The ready mixed concrete truck fleet, during such an emergency, would be under the fire chief and one member of the concrete industry should be on the civil defense staff.

The speaker said that from past war experiences the most important fire fighters could be listed in their order of importance as follows: (1) householders, (2) industry, (3) professional or city fire departments. The ready mixed concrete industry could save billions of dollars—even save us from defeat by working with local authorities to set up this additional fire fighting system. General Larsen told how Mr. Spratlen had approached him with this idea, and at the Lowry Air Base in Colorado, a detailed plan was drawn up. To help sell the idea to other ready mixed concrete producers and to city authorities, a moving picture with sound was developed. The picture told the complete story.

At the conclusion of the session, a

Murray Simpson, Super Concrete Corp., new member of executive committee

copy of the moving picture film developed by Mr. Spratlen and the Lowry Air Base was presented to R. C. Collins, president-elect, N.R.M.C.A. The film, which will be available to members of the association for presentation to important civic bodies and other organizations, can be a terrific builder of good will in any community.

Los Angeles Freeway Program

Harrison R. Baker, former vice-chairman, California Highway Commission, described how "California Attacks the Los Angeles Traffic Problem with a Freeway Program," in a paper presented before a joint session. The importance of having adequate highway systems, and the present inadequacies of our systems with the resultant waste and costs were outlined by Mr. Baker. He pointed out the intricacies involved in activating a program of highway planning construction and financing which presented a challenge demanding a frank analysis and sound solution. The two associations, he said, have a vital stake in finding a solution to this problem.

During a 10-year period beginning in 1945, the California commission has expended or obligated by appropriation for improvements, including right-of-way, $1,122,000,000 or 68 percent of a total of $1,674,000,000 since the highway system started in 1912.

In 1935 the California Highway Commission was given authority over state highways within cities and was made responsible for their construction. In incorporated cities, he said the state highway commission is responsible for both construction and maintenance. Due to the rapid growth in population since 1940 many serious problems have developed, particularly critical traffic congestion in the metropolitan areas.

Last November the commission adopted for the fiscal year 1954-55 the largest highway budget in California history; the largest of any state in the U. S. This budget totals $299,000,000. In addition, a revolving fund of $30,000,000, as a loan to the highway commission, was established by state legislation for protective advance purchase of right-of-ways.

A Constitutional provision in California requires that motor vehicle funds cannot be diverted for other purposes, but must be spent on the improvement of the highway system.

"The Importance of Federal Participation in Road Building," was the subject of an address by G. Donald Kennedy, executive vice-president of the Portland Cement Association.

Taxation Problem

In his opening remarks on the subject, "Some Aspects of the Taxation Problem which Congress will Face in 1954," John T. Sapienza, counsel for the two associations, explained that at this time his comments concerning releases of the Ways and Means Committee were tentative only as they were being changed daily.

Mr. Sapienza pointed out that a great deal of work has been expended in rewriting the Internal Revenue Code, rearranging and simplifying it. Many inequities are being itemized. Many loopholes are being plugged. The President's budget message had 25 tax proposals, most of which will be included in the tax bill. The problem is to obtain more revenue without disturbing the economy. Proposals have been made to change the depreciation basis for tax purposes. Another proposal is to reduce the tax on dividends. No consideration has yet been given to the proposal that partnerships be given an option to be taxed as corporations and small corporations be given the option to be taxed as partnerships.

Truck Mixer Standardization

Robert W. Smith, chairman, Truck Mixer Manufacturers Bureau, told about the Bureau's work in "Standardization of Ready Mixed Concrete Equipment and Processes."

On September 29, 1953, the board of directors of N.R.M.C.A. adopted a third revision of the "Truck Mixer and Agitator Standards," which since has also been accepted by the Truck Mixer Manufacturers Bureau on May 26, 1953. At this time, the board also approved a sixth revision of the "Standards for Operation of Truck Mixers and Agitators of the N.R.M.C.A." Mr. Smith pointed out that there is no conflict between these two standards.

The first change is in the rating plate that may be found on any type standard mixer and agitator. It has been modified in two ways, he said. First, the manufacturer guarantees the mixer to mix an additional ½-cu. yd. over its rated capacity, and second, as a result of the introduction of open mixers, the agitator rating is qualified, provided the manufacturer wishes to qualify it, on his own data plate.

The Bureau has established the ½-cu. yd. additional mixing capacity rather than the 10 percent increase since the latter results in a decimal or fractional rating which, he said, could be confusing to inspectors, engineers and specification writers.

The effective date for the standards was September 29, 1953, excepting that for new sizes; specifically 3, 4½, 5½ cu. yd., together with special sizes that may have been approved, such as the 6½, 7, 7½ and 8½ cu. yd. sizes, they will be considered standard for revolving drum-types. This will also apply to the 1¾, 2¼, 3 and 4½ cu. yd. for the open top revolving blade type.

New mixers, he said, such as 2½- and 3½-cu. yd., shipped prior to May 1, 1954, are not entitled to a rating plate at any time. However, all mixers with a capacity of 2½-cu. yd. or greater that are eligible under the standards of December 10, 1948, are entitled to carry the new rating plate.

Mixer Truck Tests

The report on "Tests of Concrete Truck Mixers," was explained by Stanton Walker and D. L. Bloem, director and assistant director of engineering.

Results of tests on concrete truck mixers and agitators, said Mr. Walker, covered batching, mixing and sampling, together with individual phases of each topic; that is, effect of rate of mixing, effect of amount of mixing, effect of size of batch, effect of type of loading and prolonged mixing of air-entraining concrete. In conjunction with the above discussion, Mr. Bloem showed slides with data charts and results.

Mr. Walker pointed out that time did not permit a thorough coverage of the test results, however, he explained that copies of the entire procedure, test results and conclusions had been published in pamphlet form entitled "Publication No. 50—Tests of Concrete Truck Mixers," and copies of this pamphlet had been mailed to all members.

The conclusions of this report follow: (1) For a given number of revolutions, mixing at slow speed is just as effective as mixing at a fast speed; (2) the requirements of current specifications which limit mixing to a minimum of 50 and a maximum of 100 revolutions at mixing speed are adequately conservative; (3) the mixers were capable of mixing a load of ½ cu. yd. greater than rated capacity essentially as well as one of rated capacity; (4) mixing action was sufficiently good that no difference in quality or uniformity could be discerned between those batches for which aggregate were "split" loaded and those which were "ribbon" loaded; (5) the principal effect of the prolonged mixing of air-entrained concrete which was done in warm weather, was to cause a progressive reduction in slump; (6) there was no significant difference in strength level between comparable laboratory and field batches for the same quantity of mixing water.

Effect of Fly Ash On Concrete

THE PAPER given by Delmar L. Bloem, assistant director of engineering for both associations on the "Effect of Fly Ash on Concrete" was obviously one of the most popular given at any of the association's national meetings. Fly ash is the finely divided residue that results from burning powdered coal. Mr. Bloem's paper might be said to add quantitative data to much of the qualitative bits of previously published information. Mr. Bloem pointed out that published literature has shown well constituted fly ashes to have little or no effect on mixing water requirements when used either as admixture or replacement, and when used to replace a portion of cement (generally 10 to 30 percent), reduces early strength but may add strength at later ages. When fly ash is used as an admixture, it appears to benefit strength at all ages but this effect is principally in lean mixes with the disadvantage of increased admixture requirements for air-entraining concrete. All fly ashes tested were low in carbon, high in silica, and very fine. The fly ashes were used as replacements for various percentages of cement or as admixtures in comparable concretes which would be typical of ready-mixed concrete production.

He said none of the fly ashes caused a significant increase in mixing water requirement. One fly ash caused a slight but consistent reduction as more cement was replaced up to 30 percent.

The published data, Mr. Bloem pointed out, show that fly ash improves sulfate resistance, but shows little or no effect on shrinkage and may cause slight reduction in heat of hydration. Fly ash may help to reduce damage from alkali-aggregate reaction but less than other pozzolans and conflicting evidence develops on freezing and thawing resistance—probably no significant effect.

The speaker pointed out that most of the work on which these indications were based was in relation to special problems such as mass concrete, cases where sulfate resistance and where alkali-reactivity were important. Mr. Bloem then summarized his laboratory experiments.

Sampling and Testing

Sampling and testing of ready mixed concrete was the theme chosen by Fred F. Bartel who felt reexamination of procedures was necessary as the trend was more towards selling concrete on a strength basis. He pointed out that when tests are improperly made, results are usually to the detriment of the product.

He first took up a review of sampling and felt that batch samples diverted from a mixer should be hauled in a buggy or wheelbarrow to a place where the concrete can be re-mixed and specimens molded so as to be undisturbed until the following day. Transporting green cylinders can disturb the concrete in them with probable harmful results.

Slump tests should be conducted

W. G. Hicklin, Jr., Capitol Concrete Co., Jacksonville, Fla., left, new member of the executive committee, talking with Stanton Walker, engineering director

with the test cone level and on a vibrationless base. The cone must not be allowed to rise from the base and Mr. Bartel gave emphasis to the rodding specifications as laid down by A.S.T.M.

The speaker warned against the use of poor molds, citing his experience with a cardboard mold that absorbed water from the concrete, even bonded itself to the concrete, making the test worthless. The speaker cautioned his hearers to use a ⅝-in. bullet-pointed rod for rodding; not a deformed reinforcing rod or a piece of wood as these could easily raise and dislodge coarse aggregate in the matrix. He warned against filling the mold direct from the mixer chute, and said molds should be covered with a glass or metal plate to prevent evaporation.

He discussed the care and handling of cylinders, capping, and said there was a need for at least three cylinders to obtain representative results. He concluded with a discussion of the place of the testing laboratory.

In summarizing, Mr. Bartel said " . . . there are many competent and conscientious testing laboratories operating in our field and these organizations deserve the strongest support and encouragement by our industry. There are, on the other hand, too many laboratories which are not doing their job as well as they should.

"Frequently, testing laboratories are selected on the basis of competitive bidding and as a result prices for testing are low and technicians are underpaid. This contributes to employment of poorly trained, if not incompetent, personnel by the laboratories; by the time an employe is properly trained, he moves on to a job which pays more.

"Then too, we think there is something basically wrong in having the contractor select the laboratory and pay for the testing. This puts the laboratory in the unenviable spot of having to report shortcomings of his employer to a third party. All too frequently the contractor finds he can save money by having a laborer make test cylinders and use the laboratory only to break them. It is our thought that inspection and testing are functions of the architect or engineer and should be paid for and controlled by him and not made a part of the general contract.

"Be that as it may, we would like to point out that the only measure many owners and architects have of the quality of concrete delivered to their job is the report submitted by a testing laboratory. Our reputation and, in many cases, our pocketbook are at stake in what that report states. Under these conditions, we believe tests of our materials should be made 'by the numbers' according to accepted standards so that a fair measure of our product will be made."

Selling Ready Mix

ROBERT C. COLLINS, Warner Co., covered the very timely subject, "The Ready-Mixed Concrete Salesman Faces New Conditions."

In 1930, said Mr. Collins, many ready-mixed concrete salesmen began selling during the worst depression this country has ever known. From this condition, the salesmen went into the pre-war construction boom, in which he sold more ready-mixed concrete than he thought possible. Also during this period he sold his product in competition with other ready-mixed concrete companies and to the most critical competitor, his customer, who is always in position to produce his own concrete. With this background he should be able to face the new conditions successfully.

The first sales agreement form for the association endeavored to protect the seller, said Mr. Collins. This was accomplished by limiting job service and road conditions which added up to a more favorable contract than if no written sales agreement had been used. A change in the first publication of "Standard Clauses for Sales Agreements" is the post-war increase in prices prohibiting the manufacturers from quoting firm prices. This change now reads: "All prices on ready-mixed concrete are subject to immediate revision to reflect any change in our current delivered costs of portland cement and aggregates, upon which prices are based." This clause should be on the face of the agreement.

One suggestion offered was to provide more lines for pricing of different mixes. This, he pointed out, was a condition governed by local conditions. In all cases, he said, some types of sales agreement should be used.

Heated concrete should also be included in a clause. Some companies have made a charge of 50 cents per cu. yd. with very good success.

In closing, Mr. Collins suggested that the use of the sales agreement should be the rule, not the exception. By so doing, experience has definitely shown that you will avoid a lot of trouble and unpleasantness.

Promotion Aids

S. H. Westby, manager, Housing and Cement Products Bureau, Portland Cement Association, Chicago, Ill., explained, by the use of slides, the

S. W. Westby, manager, Housing and Cement Products Bureau, P.C.A.

value of "Selling Through Promotion Aids."

Over four years ago the promotion committee of the N.R.M.C.A. and the P.C.A. met to develop a program of promotion aids to be used by ready-mixed concrete producers. Again this year the two associations worked together and made new surveys.

The results of this survey were shown in slides. Questions sent out and the percentage replying were listed.

Some of the promotional aids actually used by the ready-mixed concrete industry, Mr. Westby showed, were novelty gifts; that is, note pads, calculators, letter openers, pencils, etc. Envelope stuffers include calendars, magazine advertising, pictures, etc.

Examples of newspaper advertising shown were copies of ads as prepared by the local newspaper or by an advertising agency.

Other effective advertising, he continued, was the use of sales promotion on mixer trucks, the classified advertising section of the telephone directory, and an attractive sign on the plant.

Survey Users of Ready-Mixed Concrete

G. H. Paris, assistant director of promotion, Portland Cement Association, outlined the results of a survey as to what users think about ready-mixed concrete.

American buinessmen have found it profitable to gather opinions regarding their products. This, he said, is done by obtaining facts from polls and surveys. The results provide them with information to improve their business and meet competition more effectively.

Accordingly, in 1947 a survey was conducted by the advertising council of the P.C.A. in which 1000 questionnaires were sent to every part of the nation. In response, he said, 194 replies were received from 43 states and the District of Columbia, representing firms engaged in every major classification of the construction industry. In 1949, another 1000 questionnaires were mailed; this time to members of the A.G.C. Replies were returned from 360 firms located in 45 states and the District of Columbia.

According to the latest survey in 1953, the complaints about ready-mixed concrete, in order of occurrence, follows: (1) not as ordered; (2) undependable delivery schedule; (3) price too high; (4) variable uniformity; (5) strength not as ordered; (6) quantity delivered; (7) poor finishing qualities. Each of these factors, he said, must be corrected.

Your salesmen will sell more ready-mixed concrete if you give good service and deliver high quality concrete. The following is the frequency of complaint table prepared from the three surveys.

	Frequency of Complaints		
	1953	1949	1947
Delivery schedules	2	1	1
Strength	5	6	4
Finishing qualities	7	7	7
Quantity delivered	6	5	6
Uniformity	4	2	2
Price	3	4	3
Slump	1	3	5
Winter construction	8	8	8

Samples of Portland Cement Association advertising and promotion which were displayed by means of slides by S. H. Westby, manager, Housing and Cement Products Bureau, P.C.A.

Labor Problems

GEORGE W. GARRETT, executive vice-president, Stewart Sand and Material Co., Kansas City, Mo., discussed the Kansas City strike which started last May 10, and ended July 21.

Mr. Garrett emphasized the point, "Never permit yourself to be drawn into a situation in which your customers have the overall right to negotiate your contract for you or allow the general trades representative to be a party to negotiation involving your truck drivers."

The first negotiation move was a full page advertisement in the *Kansas City Star*, that blasted the unions in language heretofore forbidden. This ad was like a thunderbolt. From this point, he continued, things moved fast, drivers struck on defense jobs, then followed on all jobs. By May 11, the entire construction industry was down. The tie-up was complete and, as to be expected, some traitors in the community saw an opportunity to clean up and did so.

The industrial committee of the Chamber of Commerce was concerned with the effort to get action in Washington, and toward this end, four men were flown to Washington. Shortly after, the ball started rolling, and the *Kansas City Star* carried headlines of a congressional investigation of labor conditions in Kansas City. In addition, he said, the *Kansas City Star* presented this hearing as a TV show, with the result there was not an idle TV set in the city. By now the field had narrowed down to the truck drivers. However, things still were tough. The laborers had given in to the demands of the contractors.

As the end appeared near, a bombshell exploded in the middle of the concrete producers. A member had gone out to see if he couldn't settle the wage question of the truck drivers. He made unauthorized concessions, with the result that all the other producers hit the ceiling and their representative was told that no concessions would be made, and, he continued, any special deals were out and that the strike would go another 10 weeks, if necessary.

A union meeting was called and a vote was about to be cast. A recommendation was made that the men accept the offer of 10 cents per hr. then and 2½ cents the following year for a two-year contract. A vote was taken and the strike was over.

In closing, Mr. Garrett said, no concessions of any kind were made to the unions. The final settlement was indeed satisfactory. The cost to all was enormous.

New Orleans, La.

The teamsters strike in New Orleans was discussed by Herbert G. Jahncke, vice-president, Jahncke Service, Inc.

Early in May of last year the union submitted a list of demands upon us which included: certain employes of our marine department participate in the contract; straight time paid on all holidays even though not worked; 25 cents per hr. increase across the board; certain restrictions placed on duties of the mixer drivers; all truck driver foremen be covered by the contract; and the union steward to be the last man checked out each day. The union assumed, he said, that if a contract was not signed by June 30 a strike would result, and subsequently gave a 30-day notice of intention in writing. As no agreement was reached by July 1, picket lines were thrown up around all the producers' yards in the city, and as a result construction came to a standstill.

In August, apparently due to membership pressure, the union relaxed its position and in general scaled down its demands. The producers continued, in spite of heavy economic pressure, to maintain a united front. This, he added, was most significant, for without it producers would have been badly beaten.

At this time the strike had been in effect over one month, when a petition was filed with the N.L.R.B. certifying that the union no longer represented a majority of the men. This was followed with a petition to the civil district court asking for an injunction against the picketing.

The Sunday following the filing of the petition, he continued, "we sent telegrams to all the men explaining what had been done and advising them the pickets were removed and that they might return to work under the protection of the law."

The seven weeks of the strike, he said, cost the employes hundreds of thousands of dollars in wages and the loss to the companies was even greater.

Left to right: Lewis Catalino, Sam Catalino and Anthony Pelletter, Evans Builders Supply Co., Angola, N.Y.; and Henry G. Graves, Henry G. Graves & Sons, Georgetown, Del.

Mobile, Ala.

Labor difficulties of Underwood Builders Supply Co., Radcliff Gravel Co., and Smith Kelly Supply Co., in January 1953 were reviewed by Bert W. Milling, vice-president, Underwood Builders Supply Co., Mobile, Ala.

In the Mobile area, the three above mentioned companies all furnish ready-mixed concrete and the employes of the three companies are all represented by the Teamsters, Chauffers, Warehousemen, and Helpers Union. All three companies have negotiated jointly with this union for the past 10 years, he said, but have signed contracts individually as agreed upon at these joint meetings.

Thirty days prior to the expiration date, the union took a strike vote and this action was filed with the State Department of Labor.

Union demands included a 23 cent an hr. raise across the board, five paid holidays and double time on Saturdays and Sunday. However, as the deadline neared, he said the union lowered their demands.

Since the companies had negotiated together, he said, a meeting was decided on to see what course should be pursued. At this time it was decided that each company act as an individual in that this had been the method of signing contracts in the past. While the strike was still only one week old, small stationary mixers began to appear on various jobs. This was discouraging but had been anticipated.

On the 16th day of the strike, he said, "we were approached by a 'neutral' third party who offered to bring the two factions together." This action caused a meeting to be held on January 25 at which time the companies signed the contract. It is worth noting, he added, that although the union still insisted that the companies sign the contracts separately, all the negotiations were conducted jointly. The meeting resulted in a settlement satisfactory to both factions.

St. Louis, Mo.

R. F. Powell, president, Concrete Incorporated, St. Louis, Mo., addressed the joint session on strike experience in St. Louis.

"Our previous contract with the Teamsters union was due to expire on April 30, 1953," said Mr. Powell. Several months prior to this date, the union began an inter-organization "clean-up" of its members. The reason was that the old regime had become too cooperative with the industry.

This "new order" was a complete overhaul of labor-management relations that was to create some sort of utopian dream of peace. Total capitulation without regard for management's economic position was the teamsters asking price.

The demands, he said, were: a 25 cents per hr. "across the board" increase; seven paid holidays; triple time for Sunday and holiday work; an 8-hr. per work day guarantee; seniority without merit or ability; and many others that time would not permit to mention.

"It became obvious that the unions were misusing the Federal Conciliation Board service in asking for conferences solely to restate their original demands with no intent to arbitrate. At this time we demanded publicly the right to arbitrate."

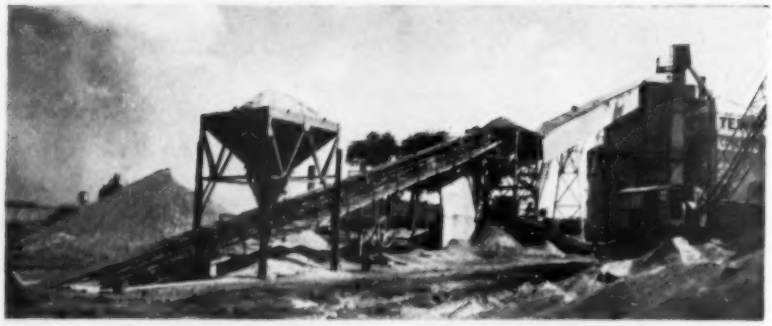
Our strike experience, he said, has taught us one important lesson; Namely "We must stand firm as a solid unit." A praiseworthy note is that during the trying period of the strike not one member slipped away.

Toledo Plan

"Enlistment of Community Support for Industry in Strike Situations," was the topic for discussion presented by Fred J. Grace, Jr., of Baton Rouge, La.

After considerable research, Mr. Grace said, he was to locate what was reported to be the best plan for industrial peace; that is, the Toledo plan. The city of Toledo, with 350,000 population, is highly industrial; including a railway center, automotive, glass and textiles, all of which depend on industrial relationships for its well being.

(Continued on page 181)



Blending aggregates on belt conveyor inclining up to batching plant

18. A producer views the ready-mixed concrete business . . .

By JAS. A. NICHOLSON*

Concrete Engineering Troubles

LABORATORY TECHNICIANS AND TESTING ENGINEERS can get us into trouble by designing an improper mix, obtaining a sample that is not representative of the delivered concrete, failing to properly prepare, protect and cure test cylinders and using faulty procedures in making compression tests.

A principal criticism that many make about the work of some testing laboratories is the employment of incompetent field personnel. In some cases, the truck driver is being paid more money than the technician who is given the responsibility for sampling and testing the concrete. This important work calls for the service of a highly trained, efficient, "feet on the ground" technician.

Others are critical of the continued use of paraffin paper molds in the preparation of test cylinders, especially on warm drying days. There is considerable evidence that on hot drying days, tests made in metal molds are better indicators of the compressive strength of the concrete. If there is a question about test results arising out of this laboratory practice, why should the savings of a few cents per cubic yard be given any consideration when the use of such methods may put quality concrete under suspicion? If low strengths develop in dry summer months, the use of metal molds should be mandatory.

A producer whose concrete is subject to strength requirements should make certain that test cylinders are being adequately protected and properly cured. On the day after their preparation, test cylinders should be taken to the laboratories and given moist curing. If test cylinders are left unprotected on jobs, with temperatures at 50 deg. F. or lower, this early exposure to unfavorable temperatures may alone cause a strength reduction up to 50 percent. In warm weather, cylinders need moist curing from the second day on. If a testing laboratory fails to provide the necessary moisture for proper curing, the ready-mixed concrete producer should not be held responsible for low strength results.

If the ready-mix producer is satisfied that concrete, on which a low test report has been received, was processed in accordance with recommended standards, the efficiency of the concrete technicians and the accuracy of the reports should be given careful investigation. If considered necessary, concrete in the structure should be cored or load tests applied as checks upon the laboratory's findings. A new tool, that has come into rather widespread use in recent years, is the "impact test" hammer, a Swedish development. The regular use of this economical tool is strongly recommended as a reasonably accurate check upon both the strength qualities of your concrete and the laboratory's report.

Job Troubles

In briefly discussing the variables of sampling and testing, we have already mentioned the important problem of meeting strength requirements. On the problem of low strength, most of us have been in trouble at one time or another. In some situations, findings based upon a single cylinder have been used to question the quality of a producer's concrete. Dependence on such limited, inconclusive evidence cannot be defended. Breaking one cylinder is no test. It takes three cylinders for a test and the results should be averaged.

Producers should be acquainted with the test provisions of the current A.S.T.M. specifications for ready-mixed concrete, C94-48:

"To conform with the requirements of these specifications, the average of all strength tests representing each class of concrete, as well as the average of any five consecutive strength tests representing each class of concrete, shall be equal to or greater than the specified strength, and no strength test shall have an average value less than 80 percent of the specified strength."

In their own operating areas, ready-mixed concrete producers will do well to check all specifications on this important point.

The development of low strengths may be due to a number of causes, including improper mix design, presence of harmful organic material, use of poorly graded aggregate, careless weighing operations, under-mixing, excessive air contents, high slumps, use of inferior (or hot) cement, faulty placing, improper finishing and inadequate curing.

It takes effective controls to achieve uniformity. The job of the ready mix man is always to process and deliver a quality, uniform product. Through the development of effective controls, careful selection of materials and employment of efficient weighing and mixing practices, compressive strength results should be held within rather close limits. When such control steps are taken, slumps from load to load will become approximately uniform as will air contents and unit weights. As control achieves uniformity on these important factors, compressive strengths will begin to develop a pattern. With controls, there will develop a definite relationship between 7 and 28-day strengths. When 7-day results are known, you will be able to use this formula to determine anticipated 28-day strengths: The square root of the 7-day strength times a factor plus the 7-day strength equals the 28-day strength. The factor is between 20 and 30, depending largely on the cement. Today, with cements being finer ground, the factor is generally closer to 20. If 7-day strength is 2500 p.s.i., the square root is 50. Multiply 50 by the approximate factor—say 20—which gives 1000 p.s.i.; add the 7-day strength (2500 p.s.i.) and you get 3500 p.s.i., the strength you can reliably expect to get in 28 days.

28 day strength = $\sqrt{\text{7-day strength}}$ x factor plus 7-day strength

28 day strength = $\sqrt{2500}$ x 20 plus 2500 = 3500 p.s.i.

All interested parties will thus know what strengths to expect at 7 days, 28 days and at any given later period. When effective controls are established, concrete of a given water/cement

*Pres. Nicholson Concrete Co., Toledo, Ohio

ratio should consistently produce test results within a limited range of strengths.

As previously pointed out, variations in cement and testing (over which the ready-mixed concrete producer has little control) may have greater effect upon the compressive strength and other characteristics of some concrete than variations in aggregate quality and processing operations, the principal responsibility of the concrete producer.

Reducing Low-Strength Complaints

A ready-mixed concrete operator lessens the possibility of low strength complaints by:

1. Processing and delivering a workable quality concrete that is well within safe water/cement ratio limits.
2. Insisting upon proper job handling—placing, finishing and curing.
3. Maintaining close contact with job operations.
4. Regularly checking the work of testing laboratories.

Other than failure to meet strength specifications, most job troubles concern the problem of durability. Durability is that lasting quality in concrete—the assurance that concrete will continue to give satisfactory performance in the face of weathering, wear, chemical action, or other harmful conditions to which it might be exposed.

Under most conditions, quality concrete stands up; poor concrete begins to disintegrate. The many forms of disintegration include pitting, popping, scaling, spalling, alkali reaction, map crazing, dusting and cracking.

Popping and pitting come principally from the use of unsound aggregate. For such occurrences, the concrete producer is unquestionably responsible. Alkali reaction, between cement and aggregates, may be involved. This is also a responsibility of the concrete producer. On such matters, ready-mixed concrete operators should take immediate, effective action. There can be no excuse for the continuance of such troubles. In some cases, pitting can develop out of the use of an oversanded mix or the bringing of laitance to the concrete surface.

A form of deterioration, in which there is a wearing-away of the top surface producing a salt and pepper effect, may be due to the presence of dark, laminated coarse particles in the sand.

Scaling and spalling are somewhat in the same category as pitting and popping with the use of unsound aggregate as a principal cause of trouble. If the disintegration takes place in the field of the concrete surface, the trouble is generally called scaling; if the disintegration is at the joints, the problem is called spalling. Spalling may be due to carelessness on the part of finishers in using excessive amounts of plastic material in an attempt to get fine tooled joints in pavement concrete. Similarly, scaling may be a direct result of improper job handling when, through over-floating and over-finishing, the top layer of concrete is composed of more fines and water than is desirable thus producing a weak permeable surface. The use of air entrainment has been most helpful in minimizing this trouble.

Concrete that is placed in late fall or early spring, when exposed in its early life to freezing and thawing or to salt applications, may scale in spite of the presence of entrained air. Concrete that has had a year's aging is much more resistive when exposed to such conditions. The forming of calcium carbonate—carbon dioxide from the air and calcium oxide and calcium hydroxide off the surface of the concrete from the cement—tends to densify the surface by sealing off capillary pores thus preventing the penetration of water into the concrete. The continued hydration of the cement throughout the early life of the concrete increases its density and decreases its permeability thus helping the concrete to resist these disruptive forces.

A problem known as Alkali Reaction, fortunately to a few areas, mostly in the West, is an expansive deterioration, occurring when cements containing harmful alkalies exceeding the 0.6 percent limitation are used in concrete with reactive soluble aggregates. This form of disintegration involves the swelling and exudation of alkalic silica gels. Even without the presence of reactive aggregate, the use of high alkali cement may be a cause of map crazing, checking and cracking.

The rather common trouble called map crazing may be due to a number of causes. Crazing may be caused by expansion of unsuitable aggregate pieces or excessive shrinkage after initial set through the use of hot or unsound cement. Segregation in handling, together with the bringing of too many fines and too much water to the surface may be the answer. Other contributing factors that might be involved include rich mix, too much paste, temperature differentials, alternate wetting and drying of surface, too rapid drying in early curing stage and movement of subsurface material with power finishers.

Dusting is one of our principal job troubles. We have made some mention of this problem in connection with basement floors, where high slump concrete is poured on either damp clay or a saturated sand fill base. Under such conditions, the only place for water to go is up, bringing with it laitance—unsound, light particles of the fines, plus some cement. In too many cases, finishers fail to remove this scum, merely slicking the surface, (smoothing off a plastic surface instead of waiting to properly finish a semi-plastic surface). We have already called to your attention the matter of surface shrinkage due to the application of dry heat from salamanders or unit heaters. We know too that the use of

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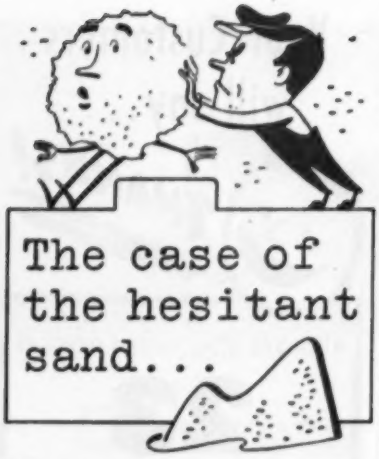

Yes, a New England foundry really did have a case like this. As the sand started down through the overhead bins and hoppers, it paused uncertainly, sort of reared back and held up production something terrible.

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excessive fines in sand and the danger of overfinishing are frequently responsible for dusting. Something else to watch is dusting caused by abrasion—traffic getting on the concrete surface too soon.

Cracking Causes and the Remedies

Our No. 1 headache is cracking in all its forms. There are some students of concrete behavior who believe that cracking is a natural occurrence about which little can be done. The majority of concrete technicians, while disagreeing with this "do nothing" theory, realize that the elimination of cracking presents a most difficult task —a job requiring the full cooperation of specification writers, design engineers, aggregate producers, cement manufacturers, ready-mixed concrete operators, contractors and cement finishers. The job calls for a continuing investigation into the relations of cracks, a study into the cause of the trouble and a preparation of recommendations that will prevent them.

The best recent work that I have seen on cracking appeared in an editorial of the *Indian Concrete Journal* by L. Boyd Mercer of Australia. This article, entitled "The Causes and Prevention of Cracking in Concrete" has already been widely distributed by The National Ready Mixed Concrete Association and copies may still be obtained from that organization. This is an article that should be given careful study by every ready-mixed concrete producer.

Mr. Mercer points out that cracks can be classified broadly into two groups; (1) those which occur before hardening—2 to 8 hr. after placement and, (2) those which occur after hardening. In the first group, before hardening, you find such causes as subgrade movement, spreading of forms, shrinkage around reinforcement or aggregate particles, shrinkage of the silica gel, false setting, loss of water into the sub-grade and the development of surface tensions due to the effects of drying.

You stop these cracks by thoroughly compacting a damp base, properly designing and constructing concrete forms, using dense plastic concrete of suitably graded aggregate, carefully consolidating the concrete, delaying final floating until internal settlement has occurred, carefully closing noticed cracks with a pressing action tied in with delayed finishing, and adequately protecting the concrete.

In cracks of the "after hardening" group, Mr. Mercer lists such causes as alternations of wetting and drying, excess of certain compounds in some cements (lime, magnesia-sulphates) presence of reactive aggregates, oxidation of reinforcing bars, temperature differentials, frost and ice action, footer failures, stress concentrations around reinforcement or at door and window openings, and other faulty structural design.

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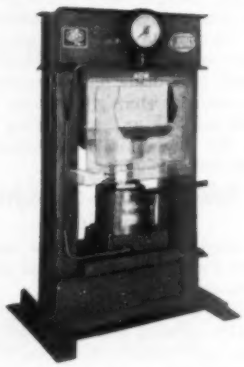

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cracks, we have to stay away from unsound and reactive aggregate, avoid the use of inferior cement, deliver dense impermeable concrete, require proper construction of footers and possibly consider the use of refrigeration. These are problems that call for the best of thinking on the part of design engineers and special consideration in mass concrete by the Bureau of Reclamation and the Corps of Engineers.

We know that on all slabs, where you have a change in direction of the concrete or a change in thickness of concrete, lack of additional reinforcing at these points will probably cause serious cracking in spite of the use of top quality concrete.

We also realize that on concrete walls—at narrow sections, at all openings (doors, windows etc.) and at corners, the lack of adequate reinforcing will cause cracking extending from the weak points. Yet in this very situation, an architect asked me, "What's the matter with your concrete?" If the architect is important enough, that's a difficult question to answer.

Checking for Durability

If your concrete hasn't the proper durability, look here for trouble:

1. Did the concrete have a high water/cement ratio?
2. Did you use unsound, inherently weak aggregate?
3. Did you fail to incorporate the protection of entrained air?
4. Is there any cement/alkali aggregate reaction or did the cement contain a high percentage of tricalcium aluminate?
5. Is there any evidence of excessive bleeding or water gain?
6. Have you got a bad segregation problem? You might want to get several cores.
7. Are you satisfied that the concrete was properly compacted, finished and cured?
8. Was high slump concrete placed in near freezing weather?
9. At what temperature was the concrete placed and how about weather conditions immediately following?
10. Was there adequate provision for drainage of exposed concrete surfaces?

When durability of your concrete is brought into question, attempt to find the answer to the puzzle, what caused the concrete to disintegrate? Is there a natural cause; (such as, early exposure to freezing and thawing, alternate wetting and drying, adjacent presence of chemical soils, etc?) What external agencies were at work; presence of gases, overheating, early application of salts, traffic abrasion? How about the properties of the hardened concrete; strength, permeability, freezable water contents, any evidence of laitance or bleeding?

Consider the possible involvement of your aggregate. Is there any possibility that unsound, deleterious, dry coated, absorptive or reactive materials were used? Find out what you can about the cement. Did the workmen

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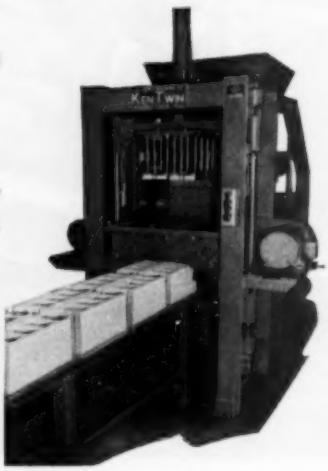

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note anything peculiar about how the concrete set or finished? Is this regular or air entrained concrete? Is there anything possibly unfavorable about the cement composition? How about hot cement? Was sufficient cement used? Attempt to get the full story on job conditions. Did the quality of the concrete seem O.K.? How was the concrete handled? Is there any evidence of excessive vibration, overheating or poor finishing? In its early life, was the concrete protected? Was it adequately cured?

Several years ago, we experienced some cracking trouble. At that time, we were using slag at all plants. We made three moves. We wetted down the slag. We standardized upon a set mixing time cycle. We changed from the use of air entraining cement to regular cement, adding the air entraining agent at the mixer. The trouble immediately disappeared and we haven't been bothered since. We still think that all three moves were important ones. When durability troubles come your way, you too will have to make changes. Better still, make the changes before you get into trouble.

One's future in the ready mixed concrete industry may well depend on wise, fair and prompt handling of quality complaints.

N.C.M.A. Convention

(Continued from page 166)

strengths developed in No. 1 test were 50 to 60 p.s.i., and 65 to 75 p.s.i. in the No. 2 test.

At this point Mr. Saeman showed a series of slides of various phases of the test procedure which included ultimate shear bond strength between masonry units and mortar, shear bond strength between masonry units and grout fill.

The next phase was a comparison of compression strength and stiffness properties in mortared piers and individual masonry units.

To date, he continued, the largest phase of the program was to construct and test reinforced concrete masonry beams, and to analyze the data taken. In this series of tests, 16 beams were tested to failure. Tests included: deflection; distribution of strain and stresses in masonry units; mortar grout and steel; ultimate strengths; and types of failure.

In continuing the program, it is planned to test reinforced columns. This phase, he said, still is tentative as the behavior of the materials is uncertain. Wall and floor sections have not been given too much thought as yet, he added, because the results of the beam and column tests will influence this design. In conclusion, Mr. Saeman thanked the association's technical director, R. E. Copeland, for his help in developing the program.

Research

Some recent developments concerning technical problems in the manufacture and use of concrete masonry

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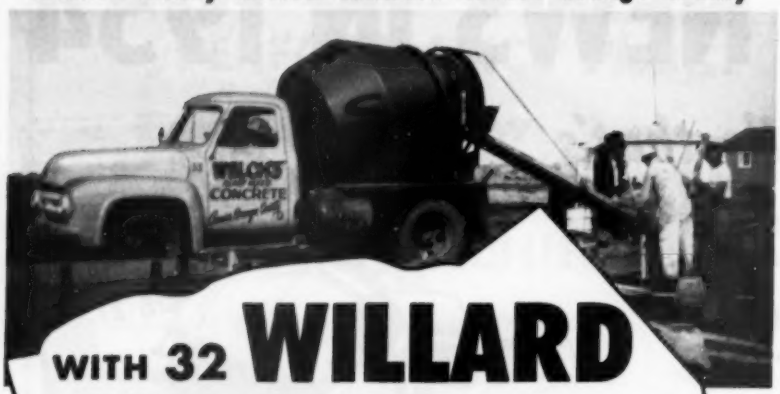

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WILLARD TRUCK MIXERS

units, were discussed by R. E. Copeland, director of engineering, N.C.M.A.

Development of new, highly mechanical, and efficient manufacturing methods, Mr. Copeland said, has made it possible for the industry to supply the market with a better product at a more reasonable price range. The rapidly increasing demand for, and use of concrete block construction in residential and commercial buildings, he said, is not only due to its fire resistance, durability, and other highly desirable qualities, but actually to the modern treatment lately introduced.

These new methods, he continued, involve considerable expense in the purchase of high production equipment, but they have made possible a better product at a reasonable price to compensate the producer. Mechanical developments are now such that it is not uncommon to note concrete masonry units being made, cured, and delivered to the masons' scaffold without being touched by human hands.

In concluding, Mr. Copeland said research being conducted on the design of reinforced concrete masonry units for floors, roofs, walls and columns indicates that concrete masonry would play an important part in the major developments of prestressed construction.

Plant Expansion

CONCRETE PIPE AND PRODUCTS CO., Richmond, Va., recently completed a $250,000 expansion program, representing an almost complete replacement of plant facilities since 1945. Included in the expansion program was the installation of additional concrete pipe manufacturing equipment, additional power plant facilities and steam-curing kilns. Concrete pipe are produced in sizes ranging from 4 to 120 in. in inside diameter. The expansion will increase the production of pipe by 75 percent and concrete block production by 40 percent. Operations were also expanded to include the production of precast beams, slabs, joists and bridge sections. Stanley R. Navas is president of the company.

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presents three *new* features that substantially improve block plant efficiency:

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Labor Problems

(Continued from page 173)

In 1949, a resolution was introduced into the city council calling for the creation of a committee to study means of minimizing labor and management misunderstandings. From this, said Mr. Grace, a committee of 18 men met, fought and discussed every labor management disagreement they could find that could have any effect on their industries.

This group of labor-management citizens of 18 formed an L.M.C. charter that provides for a tri-party organization comprised of six recognized labor leaders, six management leaders and six public leaders. The purpose was to solve labor management disputes and maintain a better working relationship.

This board meets monthly and serves as the board of last resort in particularly difficult disputes. The board, Mr. Grace said, will not hear cases of unauthorized strikes or lock outs.

Toledo, he continued, has also designed an educational program in the public schools for teaching improved techniques in settling grievances.

In closing, Mr. Grace stated that the community should recognize industries' obligation to stockholders and that it has a right to expect a fair and reasonable profit. The community owes this to its industrial development to see to it by every fair means, by economic education, that profits are made by production.

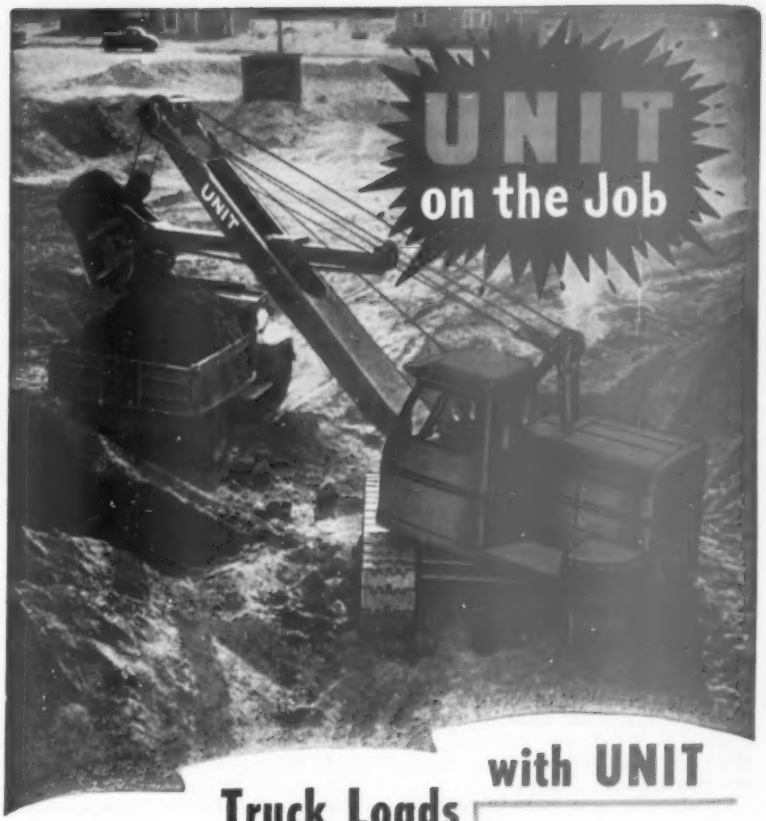
Ohio Meeting

A BREAKFAST MEETING attended by 161 persons was held by the Ohio Ready Mixed Concrete Association during the week of the National Ready Mixed Concrete Association convention. J. A. Nicholson, president of the association, presided for the session.

A highlight of the meeting was the reading of a resolution which conferred on Stephen Stepanian the honor of being elected the first honorary member of the board of directors and the first honorary life member of the Ohio Ready Mixed Concrete Association.

Following introductions and a report of the January Ohio Ready Mixed Concrete Short Course by R. P. Mumford, a panel discussion was held on Ohio's Axle Mile Tax including record-keeping, costs of record-keeping, cost of the tax and other factors.

Claude L. Clark covered the subject of the axle mile tax generally, which is a weight-distance tax for loads in excess of 18,000 lb. gross load that became effective October 1, 1953. The tax ranges from 1 cent per mile up to 2½ cents depending on the number of axles. The state expects to realize $20 million from the tax and $23 million from a one cent increase in the gasoline tax. This is a new



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theory of taxation and, as Mr. Clark cautioned, could become worse should there be failure in realizing the expected return.

Ralph H. Anderson, Anderson Concrete Corp., Columbus, told how his company keeps records, which involves the use of daily drivers' reports of origin and destination for each trip, covering 100 units. Accurate speedometer readings are a problem, due to speedometer failures, and the company is installing hubometers at a cost of $30 each in order to obtain more fool-proof records. Company records over a three months' period determined the average mileage off-the-highway, which figure has been permitted for the future as a standard deduction from total mileage for the purpose of computing the tax. The full time services of a man are required for record-keeping.

H. Edgar Pitzer, Hilltop Building Materials, Inc., Cincinnati, gave breakdowns on the cost of the tax per cu. yd. of concrete. For purpose of discussion he used the figure of 4 cu. yd. per trip and a round-trip hauling distance of 8½ miles. A clerk keeps the records and the drivers' daily records are used for checking. A monthly manifest and three months summary are drawn up to be attached to the tax form. Cost of record-keeping is $14.16 per unit per year which, he pointed out, is a hidden cost item.

Speedometer cost is $6.50 per unit

Jim Nicholson, president, Ohio Ready Mixed Concrete Association

for parts and maintenance annually and the permit costs $2. The axle-mile charge for 3-axle units in use is ½ cent per mile over the streets and roads. At an average of 10,135 miles per year, this amounts to $50.67 per unit. Thus, the total cost is $73.37 per truck unit per year. The 1 cent per gallon tax increase amounts to $33.75 per unit. The total imposition is $110 per unit annually or 3½ cents per cu. yd. of concrete.

Lewis R. Hubbard, Cleveland Builders Supply Co., pointed out the complications in keeping records and said the cost of taxes has amounted to 2½-3 cents per cu. yd. of concrete.

Broken speedometers or failure of the drivers to enter mileage readings have added up to confusion. His company is not claiming off-the-highway mileage deductions because it is not worth the expense of calculation. The simplified form prepared by the Ohio association has greatly simplified the job of record-keeping.

The association will hold its next meeting June 16 at the Cleveland Hotel, Cleveland, Ohio.

Concrete Block Production

INCREASED USE of concrete block in all types of construction has increased concrete block production by 500 percent during the past ten years, according to a survey made by the Portland Cement Association. In 1952, 1,700,000,000 block were produced by 5000 block plants. Thirty years ago, there were nearly 10,000 block plants in operation, as reported in the survey. This number has been reduced about half, with approximately 1000 plants accounting for 90 percent of the present production. Rapid development of high-production methods and the introduction of labor-saving equipment are said to have helped offset any tendency to increase prices caused by increased material and labor costs.

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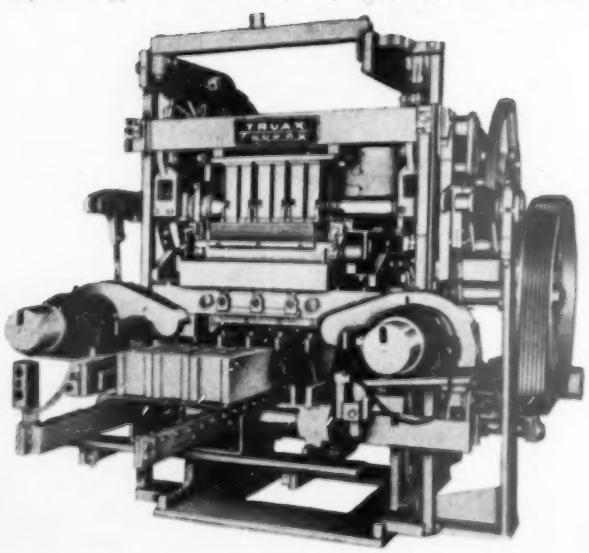

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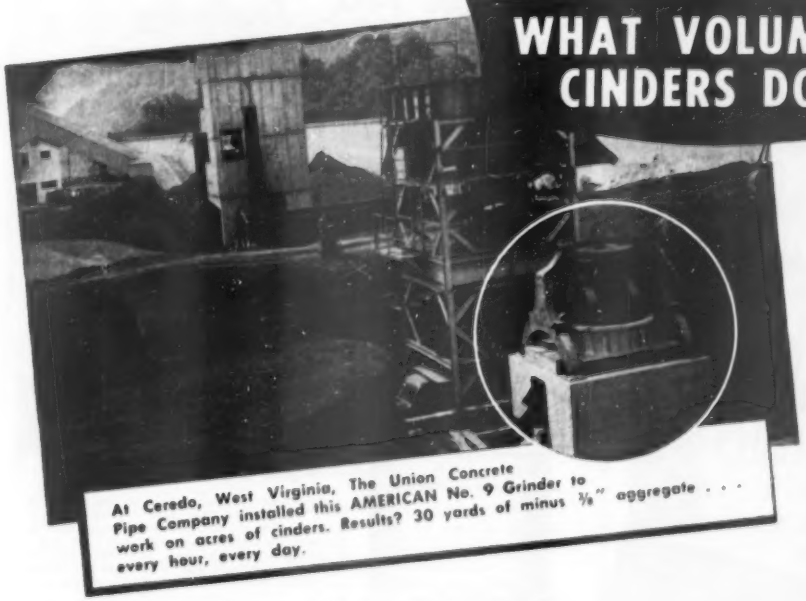

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CAPACITIES . . . YDS. PER HOUR

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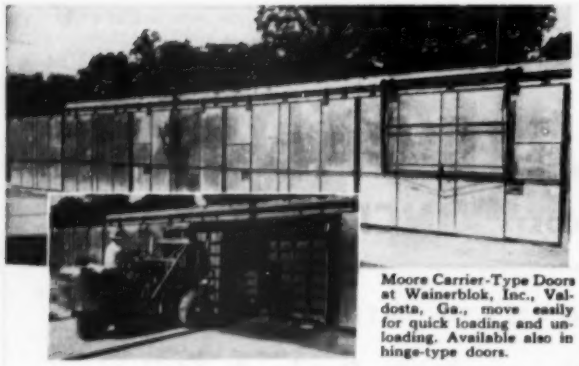

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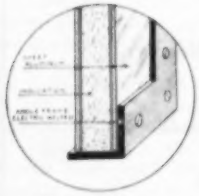

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Send us dimensions of present door openings for quotation.

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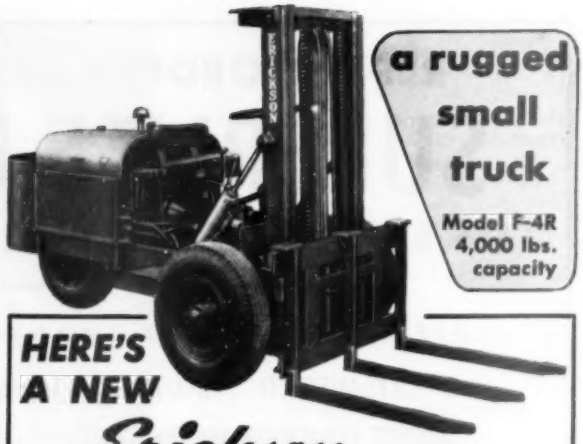

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For tricky ramps, rough or soft ground, cramped quarters—you will quickly become a booster for Erickson F-4R ease of handling, traction, balance, ruggedness. Comfortable seating space reduces operator fatigue. The F-4R is designed for more work per day—built for lower cost per year. Erickson quality is economy for you! Forks, mast and lift heights as ordered, twin tilt cylinders, 4 speeds forward, 4 speeds reverse. Side-shifter, scoop and other attachments available.

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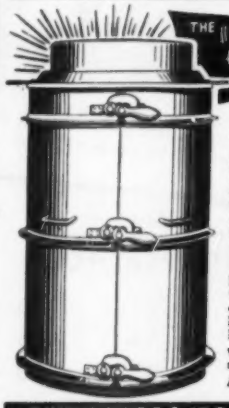

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BES-STONE Block Splitter

Made in 2 Sizes — 18″ and 24″ Models — Produces 960 Split Block per Hour in Fast, Automatic Operation

Splits block in a straight line, with speed and precision and with the utmost safety. The block is placed under the knife automatically . . . the blade descends with a smooth, hydraulic action . . . and the split block is ejected by the incoming block. The operator is always at a safe distance. Machine is easily adjusted for various block heights. The 18″ model, shown here, splits block 16″ or 18″ long, 1⅝″ to 8″ high. A larger 24″ model splits any length up to 24″, heights up to 8″.

BES-STONE is a new masonry unit with a quarried stone appearance. Can be produced in many sizes and in a series of attractive, permanent colors. No conflict with conventional block. It complements and greatly increases sales of standard stripper block. Write for Bulletin.

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the Split Block with Character

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To Build Modern . . . *without Price Penalty* . . . Build of Cavitex

Among today's home builders the swing is to masonry. And the ultra-modern masonry is Cavitex. With eye-appeal and price appeal, Cavitex has unusual interest for building contractors and owners alert to modern trends.

Cavitex is new—in size, proportion, design and color range. Cored-out design provides insulation values and saves weight. Easily the most practicable unit for cavity-type wall construction. Ideal also, as veneer over frame, or as facing over 4″ concrete block. Available in pastel tones for exposed masonry interior walls.

Expensive? Just the reverse! Material for material, Cavitex costs less than frame. This low price made possible by manufacturing economies. Local plants convert local raw materials into units for local builders. Usual high costs of freight and distribution are practically eliminated. Write today for 4-color brochure and name of nearest local production plant.

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Local Manufacturing Opportunity

Many choice locations are open for the local manufacturing of Cavitex. Excellent opportunity for concrete products manufacturers. Each plant operates under franchise in protected territories. Cavitex machine available on lease or sale. If interested, ask for "Opportunity Unlimited."

X-2

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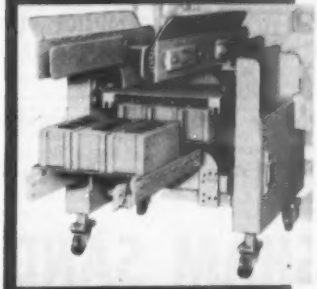
Returns Pallets OVER outcoming block!



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- Uses 18-1/2 x 26″ or 19 x 27″ pallets
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- Eliminates pallet chain conveyor ass'y

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70% Stone–30% Sand–Meeting Highest Tests

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Hydraulic, Automatic Block Machine, 3 at a time. Plain Pallets 18½ x 26". Half height or full height block; quick changeover. $6,000.00

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BLUE RIDGE TALC CO., INC.
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Proved to last as long or longer—yet cost considerably less. Write for prices.
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Complete Equipment for small block plant including:

Kent Vibra Tamp Machine.
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Steel aggregate hopper holds one day's production.
8" Mold box complete with base & vibrator.
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20 New steel racks 64 cap never used.
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Attachments for Sash Corner Bull Nose & Half block.
Approximately 1800 steel pallets.
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WANTED

1000 ft. of light rail about 12 lb. per yd. and 20 block cars on wheels 24 gauge.

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PALLET RINGS
Write for full information
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BIONETIC is a safe, sure, economical method.
Cleans sewage solids from tank.
Eliminates odors.
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Harmless to humans and plumbing.

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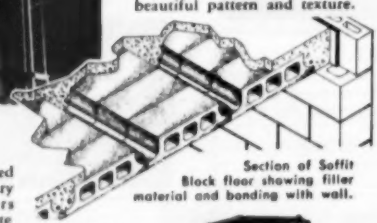
SELL MORE BLOCK ON EVERY JOB!

Furnish VIBRAPAC SOFFIT BLOCK for ALL FLOORS and ROOFS

Removing Centers from Finished Floor.

Permanent, Fireproof Floors and Roofs. Low initial cost and maintenance. Natural base for radiant heat installations. Provide surface of maximum accoustical and insulation value. Can be plastered, or if left exposed, makes a ceiling of beautiful pattern and texture.

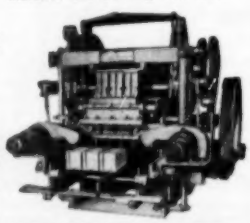


Section of Soffit Block floor showing filler material and bonding with wall.

Soffit Block are supported in place with temporary adjustable steel centers while reinforced concrete slab is placed and cured. This eliminates timber shoring and leaves space below clear during construction.

BESSER VIBRAPAC PRODUCES SOFFIT FLOOR AND ROOF UNITS

The same machine that produces high quality concrete masonry units in all styles and sizes, using Plain Pallets. Continuous, full capacity operation. Fully automatic. No machine operator required.



BESSER MANUFACTURING CO.
ALPENA, MICHIGAN, U. S. A.
Complete Equipment for Concrete Products Plants

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

SEE INDEX OF ROCK PRODUCTS SECTION ADVERTISERS ON PAGES 197, 198

Bergen Machine & Tool Co., Inc. 152, 185
Besser Manufacturing Co. 148, 155, 156, 185, 188
Blaw-Knox Company 190
Binney & Smith, Inc. 176
Blue Ridge Talc Co., Inc. 187
Builders Equipment Company 183, 187
Burmeister, L., Co. 189

Cleveland Vibrator Company 176
Clipper Manufacturing Co. 147
Columbia Machine Works 159
Columbian Carbon Company 176
Concrete Products Company 187
Cook Bros. Equipment Company 160

Davis, Frank D., Co. 178
Dunn, W. E., Mfg. Co. 185

Erickson Power Lift Trucks, Inc. 184, 187

Fleming Manufacturing Company 184
Framingham Sand & Gravel Co., Inc. 186
Friendship Block & Brick Co. 187

Gerson Co. 187

Haynes Products Co. 187

Johnson, C. S., Co. 150, 151
Jones, J. A., Concrete Machinery 176

Kent Machine Co. 178
Koehring Company 150, 151

Landers-Segal Color Co. 187
Lin-Cor 187

Mapico Color Division 176
Marietta Concrete Corporation 157
Medusa Portland Cement Company 154
Midway Concrete Products Inc. 187
Mid-Western Concrete Equipment Co. 187
Moore Dry Kiln Company 184

Oswalt Engineering Service Corp. 180

Quinn Wire & Iron Works 184

Reliance Chemicals Corp. 187
Riddell, W. A., Corp. 183

Schenectady Cast Stone Co., Inc. 187
Smith, T. L., Company 179
Star Expansion Products Co. 188

Texas Foundries 187
Towmotor Corporation 177
Truax Machine Co. 182
Truck Mixer Manufacturers Bureau 158

Union Builders Supply & Fuel Co. 187
United Builders 187
Unit Crane & Shovel Corp. 181
United States Steel Corp. 146
Universal Atlas Cement Company 146

Watkins Cement Block & Supply Co. 187
Weeks Concrete Products 187
Willard Concrete Machinery Sales Co. 180
Williams, C. K., & Co. 175
Williams, Roger F. 184
Worthington Corporation 153

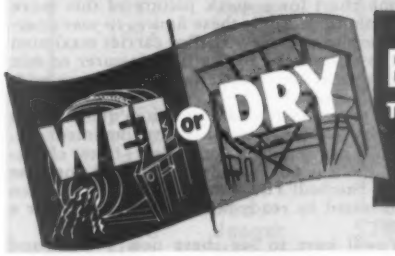
Here's Why...

GOLTERMAN MATERIALS
OF ST. LOUIS, MISSOURI

Converted Their Plant from DRY to WET Operations

- **To gain better control of concrete through central plant mixing.**
- **To preshrink concrete thereby making it possible to carry an extra yard per truck.**
- **To reduce maintenance costs on truck mixers.**

If you operate one or more dry-batch plants and wish to obtain the economies of central plant mixing, we urge you to investigate the advantages of Burmeister Tilt-Up Mixers. Available in 3, 4, 5, and 6 cu. yd. capacities they offer a scientific "two-fold" mixing action not found in ordinary tilting mixers; feature Twin Drive; and a hydraulic tilting mechanism which eliminates the compressor. Burmeister's exclusive Tilt-Up design actually reduces normal headroom requirements permitting a Burmeister to be used where other mixers will not fit. If you can't convert with a Burmeister, it can't be done!



BURMEISTER'S THE BUY!

MAIL COUPON FOR DETAILS
on easy conversion to wet operations with Burmeister "Tilt-Up" Mixers.

L. BURMEISTER CO., 4529 W. Mitchell St., Milwaukee 14, Wis.

Burmeister
COMPLETE PLANTS FROM A SINGLE SOURCE

L. Burmeister Co.
4529 W. Mitchell St.
Milwaukee 14, Wis.

☐ Please send me your complete catalog and information on converting from dry to wet operation. I have a _____ plant.
Name Model

☐ Have your Representative call.

Name _____

Company _____

Address _____

City _____ State _____

BLAW-KNOX proudly presents

the NEW 5½-cu. yd. and 6½-cu. yd. Hi-Boy TRUKMIXERS

BETTER WEIGHT DISTRIBUTION FOR BIGGER, USABLE PAY LOADS

HERE'S THE NEW STAR of the Hi-Boy Trukmixer line *which changes gross load into usable load!* The pay load pay-off is in the efficient weight distribution of this new design. By combining the flush water tank with the front drum pedestal and mounting the motor at the rear of the mixer, the distance from the center of gravity to the front of the mixer is reduced by 20", *and the weight is cut by approximately 1000-lbs.!*

Take a look at the chart for a quick picture of this more practical weight distribution. Apply these figures to *your* operations . . . it's easy to see how the new Hi-Boy carries maximum pay load legally. It is guaranteed by the manufacturer to mix half a yard over the normal rated capacity in accordance with TMMB standards.

Simple, efficient design permits quick access to every part for faster, less costly maintenance. The bigger charging cone allows faster charging . . . 8 to 10 seconds per yard of concrete being batched! The new Trukmixers have been field tested by ready-mix operators for over a year!

You'll have to see these new 5½-yd. and 6½-yd. Hi-Boy Trukmixers to believe that any manufacturer could include so many practical, profitable features in one unit. Ask for a complete description today!

WEIGHT ON THE ROAD OF JUST A FEW TRUCKS WITH THE 5½-CU. YD. HI-BOY LOADED WITH *5½-CU. YDS. NORMAL CAPACITY AND **6-CU. YDS. GUARANTEED MIXER CAPACITY

Truck	Model	Wheel base	Weight in lbs. on front axle		Weight in lbs. on rear axle		Total Weight in lbs.	
			*5½-yd.	**6-yd.	*5½-yd.	**6-yd.	*5½-yd.	**6-yd.
Mack	B-425	182½"	13,787	14,177	30,461	31,888	44,248	46,065
White	WC-2264	178"	12,405	12,980	30,675	32,017	43,080	44,897
IH	RF-192	175"	11,360		31,592		42,952	
Reo	F-226M	170"	12,795	13,218	29,713	31,315	42,508	44,533
GMC	W620-42	183"	12,183	12,512	30,425	31,913	42,608	44,425
Ford	T-800	175"	9,761		31,384		41,145	

NOTE—*Weights shown are for mixer in same position on truck for both size batches, and include flush water and gas for mixer.*

See your BLAW-KNOX distributor for details

Ask about the "Complete Ready-Mix Package"

It contains everything you need for fast, profitable operation . . . batching, charging or mixing plants, clamshell or concrete buckets, plus the new 5½-yd. or 6½-yd. Trukmixer, or smaller Hi-Boys.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh 38, Pa.
Offices in Principal Cities

BLAW-KNOX

TRUCK MIXER FLEET FOR SALE

MACK TEN WHEEL TRUCKS — JAEGER-REX-TRUCK MIXERS

ALL AVAILABLE IMMEDIATE DELIVERY

	MIXER			TRUCK				Selling
Year	Make	Model	Ser. No.	Year	Make	Model	Ser. No.	Price
1950	Jaeger	4½HMTL	J12118	1947	Mack	LFSW	LF2D-1099	$ 5,750
1951	Jaeger	4½HMC	J14344	1947	Mack	LFSW	LF2D-1127	6,250
1952	Jaeger	5½TC	J13350	1947	Mack	LFSW	LF2D-1233	6,300
1947	Jaeger	5½HMB	None	1942	White	——	251085	3,050
——	Rex	5½ yd.	TNN-288	1942	White	——	261134	3,500
1950	Jaeger	5½TC	J11633	1950	Mack	LJSW	LJ2D-2880	9,450
1950	Jaeger	5½TC	J11632	1950	Mack	LJSW	LF2D-2885	9,450
1950	Jaeger	5½TC	J11630	1950	Mack	LJSW	LJ2D-2883	9,450
1951	Jaeger	5½HMC	J12723	1950	Mack	LJSW	LJ2D-2882	9,450
1950	Jaeger	5½TC	J11634	1950	Mack	LJSW	LJ2D-2879	9,450
1952	Jaeger	5½TC	J13349	1950	Mack	LJSW	LJ2D-2881	9,750
1950	Jaeger	5½TC	J11635	1950	Mack	LJSW	LJ2D-2888	9,450
——	Rex	4½ yd.	TH302	1950	Mack	LJSW	LJ2D-2886	8,750
1950	Jaeger	5½TC	J11629	1950	Mack	LJSW	LJ2D-2887	9,450
1947	Rex	5½ yd.	TNN-360	1952	Mack	LFSW	LF2D-2553	8,950
1952	Jaeger	5½TC	J13347	1952	Mack	LFSW	LF2D-2557	9,750
1952	Ransom	5½ yd.	52932	1952	Mack	LFSW	LF2D-2555	9,250
1952	Jaeger	5½TC	J11631	1952	Mack	LFSW	LF2D-2556	9,450
1952	Jaeger	5½TC	J13355	1952	Mack	LJSWX	LJ2DX-4884	12,900
1952	Jaeger	8TC	J13341	1952	Mack	LMSW	LM2DX-2906	16,500
1947	Rex	4½ yd.	TR-473	1947	Mack	LFSW	LF2D-1116	5,800
1947	Rex	4½ yd.	None	1947	Mack	LFSW	LF2D-1117	5,800
1952	Ransom	3 yd.	None	1945	Fed.	——	None	3,500
1944	Blaw-Knox	4 yd.	None	1944	White	——	251363	3,500
1944	Blaw-Knox	4 yd.	None	1944	White	——	None	3,500
1944	Blaw-Knox	4 yd.	None	1944	White	——	251867	3,500
1947	Rex	5 yd.	None	1944	White	——	250731	3,500
1944	Jaeger	4 yd.	None	1944	White	——	251783	3,500
1944	Jaeger	4 yd.	None	1944	White	——	None	3,500
1944	Jaeger	4 yd.	None	1944	White	——	256987	3,500
1952	Jaeger	5½TC	J13353	1950	Mack	LJSW	LJ2D-2884	9,450
1952	Jaeger	5½TC	J11628	1952	Mack	LFSW	LF2D-2554	9,450
1952	Jaeger	5½TC	J11626					2,750
1947	Rex	5½ yd.	TNN-407					1,250
1952	Jaeger	4½HMC	J14345					3,450
1947	Jaeger	4½HMB	None					1,500
1946	Jaeger	4½HMB	None					1,500
1947	Rex	4½	TR286					950
1947	Rex	4½	TR288					950
1946	Jaeger	5TC	None					450
1951	Ransom	5½	52355					2,750
1947	Jaeger	5½	J11014					1,750
6 1952	Jaeger	6½HMC						3,750
6 1949	Jaeger	4½HMB						2,500
3 1950	Ransom	5½ Hi-Dump						2,500

This equipment used on one job with careful supervision and maintenance.

A number of truck mixers unmounted can be used to meet your requirements—will substitute truck or mixer.

TC indicates horizontal mixer;

HM indicates high discharge mixer.

Terms can be arranged with responsible purchasers.

JAEGER-LEMBO MACHINE CORPORATION
Northern Blvd. at 127th Street
Flushing 52, New York
Newtown 9-7777

JAEGER-LEMBO MACHINE CORPORATION OF NEW JERSEY
U. S. Highway 22
Springfield, New Jersey
Millburn 6-1066

Used Machinery

1—5" LeCourtenay B2 centrifugal water pump—665 gpm, 43' head, 1750 rpm, with complete base, no motor $85.00

1—6" x 6'8" used sand discharge hose; good condition $35.00

1—New Pantograph type push-off device, manufactured by Clark Equipment—never used—new 1952 .....$690.00

100 New wooden oak 40" x 48" "Take it or leave it" pallets never used—cost $7.39 each $4.00

1—Westinghouse used induction motor with base—100 hp, 580 rpm, type MS, 3/60/440, serial #987904—with GE drum controller and starter including one 1948 100 hp GE type B, catalogue #8232638-64-T, magnetic starter $550.00

1—Westinghouse used 75 hp induction motor, 870 rpm, style #160835, serial #1320014—without base—in perfect condition including GE starter CR 1034 KI, size 2, catalogue #2019079 G 10—complete with relay—2 speed starter $775.00

1—General Electric circuit breaker 3/60/440, MI 1969132 G 2, P 3108, type HA 2, 100 hp capacity $50.00

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SOUTH RIVER SAND CO.
OLD BRIDGE, NEW JERSEY

AIR COMPRESSORS — ELECTRIC
3800 Ft. Inger. Rand 635 HP 2300
3078 Ft. Inger. Rand 500 HP 440
3070 Ft. Chgo. Pneu. 500 HP 2300
1568 Ft. Chgo. Pneu. 250 HP 2300
1098 Ft. Inger. Rand 175 HP 440
781 Ft. Chgo. Pneu. 125 HP 230/440

LOCOMOTIVES
5—44 Ton G.E. Diesel electric.
1—25 Ton G.E. Diesel electric.
1—10 Ton Davenport Gasoline.
1— 6 Ton Brookville diesel.

25 TON DERRICKS
1—Model E Wiley—60 ft. Boom, steel stiff leg Derrick.

5 NEW MERRICK WEIGHTOMETERS
Model E for 24", 30", 36", 42" Belt.

JAW CRUSHERS
10" x 7" Allis Chalmers Blake.
40" x 10" and 30" x 10" Good Roads Roller Bearing.
20 x 10, 30 x 13, 36 x 24 Farrel Blake.
30 x 42 Buchanan Blake.
42 x 48 Traylor Bulldog, Blake.
60 x 48 Power & Mining, Blake.

PRODUCTION CRUSHERS
2 Ft. Symons, standard, boarse bowl.
#636 Allis Chalmers hydrocone.
10" Allis Chalmers Superior McCully.

HAMMER MILLS
36" x 24" Jeffrey B-2.
36" x 36" Jeffrey B-3.
#6 XD Gruendler reversible.
SXT-11 Pennsylvania Thor.

PULVERIZERS
Hercules Junior 3 Roll Mill.
#1 Raymond Automatic Pulverizer.
#47 Raymond IMP. Mill—60 HP.

4 KILNS & DRYERS
4' x 20', 6' x 40', 6' x 60', 6' x 80'.

R. C. STANHOPE, INC.
60 E. 42nd St., New York 17

CONVEYOR AND ELEVATOR EQUIPMENT

18"x130' b.b. conveyor with belt.
16"x132' c. pl. b. conveyor with belt.
14"x78' c. pl. b. conveyor with belt.
24"x50' c. pl. b. conveyor with belt.
24"x30' c. 5 roll idlers, new belt.
20"x31' c. 5 roll idlers, new belt.
30"x155' c. 5 roll idlers, 5 ply belt.
36"x112' c. 5 roll idlers, new belt.
46-42" r.b. trough idlers, channels.
Super cap. elevator 20"x75'—6 mos. old.
10"x60' encl. spaced elevator, motor.
New 14"x6' ply elevator belt.
9"x54' screw conveyor, motor and reducer.
9"x11' screw conveyor.
12"x12' screw conveyor, motor and reducer.
Good Roads #1030 r.b. crusher.
Selectro 4' x 6' vibrating screen.
20" Putnam lathe 12' bed, 3 chucks.

G. A. UNVERZAGT & SONS, INC.
136 Colt Street, Irvington 11, New Jersey

CRUSHING EQUIPMENT

1 Secondary Plant consisting of the following:

54"x24" Pioneer Triple Roll Crusher, powered with a GM6-110 diesel engine.

2—21 cu. yd. Steel Bins.

1—24" Plate Feeder.

1—100'x24" Pioneer Conveyor.

2—70'x24" Pioneer Conveyors.

1—3'x12'—3 deck Simplicity Screen.

Necessary electric motors and drives.

CONTRACTORS MACHINERY COMPANY
530 Monroe Avenue, N.W.
GRAND RAPIDS 2, MICH.
Phone: GI 6-5484

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TOLEDO SCALE. Model 63-7743, 60,000 lb. capacity, 34 x 10 foot platform with unit weight printer, never been used, substantial discount.

24 foot Enclosed Cup Conveyor in perfect condition.

Cedar Rapids 10 yard Portable Bin with U2 motor and conveyor.

304 Koehring ¾ yard Power shovel.

UD18 International Diesel—not used since complete overhaul—new crankshaft, pistons and sleeves.

Lippman Jaw Crusher 24 x 36 Perfect condition. Mounted on chassis except wheels with a new 36 x 12 foot Pioneer Apron Feeder with discharge Conveyor. Plant powered by Cat. D 4600.

Portable Cedar Rapids 40 x 33 Hammermill Plant powered by GM twin diesel. Plant perfect for producing chips, road rock or any graded stone. Will sacrifice.

2—40 ton Lippman Steel Bins.

NEUHEISEL LIME WORKS, INC.
1339 Menomonie St., Eau Claire, Wis.

PIPE PREFABRICATION
PILING—Tubular & Sheet

- Pile Points & Sleeves
- Valves
- Fittings
- Tube Turns

Pipe—Small and Large Diameters, Iron & Steel, welded, seamless, corrugated

SPEED-LAY PIPE SYSTEM | Free Brochure

ALBERT PIPE SUPPLY CO., Inc.
Berry at North 13th Sts., Brooklyn 11, N. Y.
Phone EVergreen 7-8100

CRUSHERS: Gyratory 30", 36", 42", and 48". Nos. 12, 10, 9, 7½, 6, 5 Allis-Chal. and others.
JAW TYPE: 24x36, 25x40, 28x36, 40x48, etc.
CONE TYPE: Symons 2, 3, 4 and 5½'. No. 36 Telsmith. Also Kennedy 19, 25, 37 and 49. Traylor 1'3" and 2'4" TT. Newhouse 7, 10 and 14". Steadman 24, 30 and 36" Impact. Allis-Chalmers Tr. B.
ROLLS: Allis-Chal. 72x30, 54x24, 54x20, 40x15 and 18x10. Pioneer 18x30. Universal 16x24. New Holland 24x16 and 16x16. McLanahan 18x24 and 18x20.
HAMMERMILLS: Williams Nos. 2, 3, 4 and 6. Day Nos. 66 and 70. Gruendler 2XB and 3XB. Dixie 2040, 2650 and 3040, and others.
MILLS: Hardinge 3'x8", 6'x22", 6'x8' and 8'x4'. Kennedy 4x8, 8x8, 8x11. Marcy 4x5, 6x4, 7x16. Raymonds, Sturtevants and others.
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DRYERS: 60"x80', 7'x50', 10'x90', 8'x50'. Etc.
SCREENING PLANT: Large modern plant new in 1946, priced at ⅓ original cost.
DRAGLINES: Page 8 yd. 100' Bm.; Page 6 yd. 125' Bm.; 5W Monighan 5 and 7 Yd. 125'.
BINS & BATCHERS: 30 yd. capacity & larger.

MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kiln, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

MARIETTA ALEX T. McLEOD KANSAS

FOR SALE

Model "WK-60" Sullivan "365" Cubic-Foot. Portable Air Compressor on four pneumatic tired wheels, Serial #23779 equipped with "D-13000" Caterpillar Diesel Engine. Price f.o.b. St. Louis—$3450.00.

Model "WBK-2004" Gardner-Denver "500" Cubic-Foot Portable Air Compressor on four steel wheels, Serial #136933 equipped with "D-13000" Caterpillar Diesel Engine. Price f.o.b. St. Louis—$4850.00.

RENTAL EQUIPMENT COMPANY
5515 Bulwer Avenue, St. Louis 7, Missouri

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Rainbow Rock Machine. Makes colored slump blocks in 24 inch length, 3½ inch wide, 1½, 2½ and 3½ inch thick. New—Has never been unpacked—Priced to sell $495.00.

ACME BLOCK & SUPPLY CO.
1506 Mackinaw St., Saginaw, Mich.

Profitable rock crushing and agricultural lime business in Kansas City, Missouri area for sale, due to owner's health.

BOX M-17, ROCK PRODUCTS
309 W. Jackson Blvd.
Chicago 6, Illinois

RAILS
NEW — RELAYING — TRACK ACCESSORIES
MIDWEST STEEL CORP.
5M DRYDEN STREET
CHARLESTON, W. VA.
IMMEDIATE DELIVERY

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT
WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

Special Crushers!!

Pioneer 40x22 roll crusher Diesel powered.
Cedar Rapids 40x30 Hammermill Twin GMC Diesel.
Jeffrey Flex-Tooth 42x36" hammermill.
Pennsylvania C-4-30 Reversible Hammermill.
Jeffrey Type B Hammermill 36x42".
Raymond No. 412 bowl pulverizer mill.
FARREL-BACON 36" x 44" Jaw Crusher.
Traylor TX 4' with 200 hp. electric motor.

DREDGES

Elliott 12"x16" new pump with new V-12 335 HP Diesel engine. Port. steel hull.
Elliott 8" with cutter. Diesel. Hull 48'x18'x3'6". 8" Hydraulic. Diesel. On 32'x8' steel pontoons.
Amaco 10" Diesel power portable. Excellent.
6" portable Diesel complete with cutters, etc.
8" H-P twin Diesel drive. Complete.

CONCRETE PLANTS AND EQUIPMENT

Heltzel 1000 bbl. cement silo with elev. scales, etc.
Smith 56-S two yard tilting mixer. Complete.
Johnson 200 yd. 5 comparts. Complete large plant
Johnson 150 yds. new 1950 3 compt. aggr. one cement ground silo 500 bbls. two 28-S mixers.
Johnson 55 yds. 5 compts. aggr. and cement 1050 bbls. silo.
Fuller-Kinyon Model H Port. cement conveyor.
Butler 250 bbls. cement B-K 100 ton 3 compt. agg.
NEW 1-S 100 ton agg. Bin 3 compt.
NEW 2-S 400 bbl. cement bin complete.

CRUSHING PLANTS

Cedar Rapids Portable Super Tandem, excellent.
Pioneer 40-V. New 1946. Portable. Diesel power.
Pioneer WA-300, crushing, washing, screening.
Cedar Rapids AAA Port. Primary crusher 20x36.
Cedar Rapids 40x33 Port. Secondary, Diesel.
Cedar Rapids Portable Master tandem.

CRUSHERS

JAW: Acme 10x20, 14x26, 14x28, 10x42, 16x32. 18x32, 25x40. Eagle 20x36. Diamond 24x36". Cedar Rapids 10x20, 20x36, 25x40. Farrell 10x20, 13x20, 14x36, 18x36, 36x48. Buchanan 36x42. Good Roads Reliance 15x30. Traylor 18x36, 24x36. Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Champion 1036, 1040, 1236, 1580.
GYRATORY: Allis-Chalmers-McCully, 6", 7½", 8", 9", 12K, 20", 30", 42", 14", Newhouse, 24", 36", Gyrasphere, 18", 28". Intercone Telsmith, Telsmith 5H, 10-B, 13-B, 16-B. Kennedy Van Saun 7, 19, 25½-S, 37. Traylor Ty 1'8", Ty 2'4", T-4½".
ROLL: Cedar Rapids 40x20. Diamond 40x22. Pioneer 30x18. Telsmith 24x16. Pioneer 30"x16". New Holland 24x16.
HAMMERMILL: Size 4 Williams Jumbo, Pennsylvania 8X2, 22x22. Cedar Rapids 20x33. Jeffrey 36x42. Jeffrey 36x24, 36x40.
BALL MILL: Hardinge 10'x48". K.V.S. 6'x8' Type M Air Swept J-H 6'x8', Hardinge Conical 6'x22". Colorado Iron Works 5'x6'; Marcy No. 64½. Hardinge conical 10'x36".
ROD MILL: March 2'x6', 3'x6'. Allis-Chalmers 4'x8'. Hardinge No. R 204. Marcy 5'x12'. Hardinge 5'x22".
CONE: Symons 2' coarse bowl, 3' standard head.
TUBE MILL: Smidth 5½x20, K.V.S. 4'x7', Traylor 5'x22'.
DRIERS: Struthers-Wells 7'x84'; others 7'x20', 6'x60', 7'x70', 6'x40' and Cedar Rapids 60"x24'.

SHOVELS—CRANES—DRAGLINES

P&H 955 A1C Crane 2½ yds. 150' bm. 1951.
P&H 655-B, 1½ yd. Diesel Crane, 60' bm.
P&H 255-A, ¾ yd. Shovel-Crane, Diesel.
N-W 80-D 2½ yd. Dragline. Diesel. 100' boom.
N-W Model 6, 1½ yd. Diesel Shovel.
Buc-Erie 51-B Diesel Shovel. Practically new
Northwest 80-D Diesel Shovel 2½ yd. New 1951.
Lorain L-820 2-yd. Shovel-Dr ag-Crane 100' Boo
Northwest 80-D Shovel-Drag. New 1948. Excellent.
Lima 1201, 2½ yd. Diesel Shovel.
Manitowoc 3500, 2½-yd. High Lift Shovel.
Buc-Erie 54-B Diesel Shovel, 2½-yd.
Lorain Model MC 414, Moto-Crane, 85' Bm. Exc.

SCREENS

Seco Double deck 6'x12'.
Kennedy-Van S. 4'x10' three deck.
Telsmith heavy duty washer 60"x13'.
Diamond 4'x10' three deck.
Lippman 4'x12' single deck.
Simplicity 4'x10' four deck.
Symons 4'x14' double deck.
Tyler 4'x10' two deck heavy duty, motor, Gen. Set.
Robbins Vibrex 3½ deck 4'x12' Model 48-144.

TRACTORS

2 Cat. D8 Angledozers with DDPCU rebuilt.
Int. TD-18A with B-E Bulldozer.
Int. TD-24 with B-E Cable Bulldozer.
All-Chal. HD19 Angledozer, Hydraulic.
All-Chal. HD7 with Gar Wood Angledozer.
Allis-Chal. HD19 with hydraulic control angledozer.
Cat. D4 Traxcavator with 1 yd. bucket, hydraulic

LOCOMOTIVES

45 Ton G.E. Diesel Elec. Loco., std. ga.
25 Ton Plymouth gas loco., std. ga.
Vulcan 20 ton standard gauge type 0-4-0 gas.
20 Ton Vulcan, gas, std. ga., rebuilt.
25 Ton Vulcan steam, std. ga., Side tank.
15 Ton Whitcomb 36" ga. gas.
Plymouth Model ULDA std. ga., 10 ton, Diesel.

DERRICKS

Steel 50 ton stiff leg derrick 90' boom. Complete.
American Terry 20 ton Guy Derrick, 100' boom.
Clyde 30 ton stiff leg 90' boom.
Guy Derrick, 15 tons, 115' mast, 105' boom.
American 25 ton stiff leg derrick, 90' boom.
Special 35 ton stiff leg derrick, 100' boom.
Nat'l Bridge 30 ton Guy Derrick, 100'.
American 30 ton stiff leg, 100' boom.

ASPHALT PLANTS

Barber-Greene Model 845. Complete.
Hetherington-Berner Model M-12 1500# Pugmill.
Madsen 4000# Complete. New 1951. Excellent.
Overmander Monotrole 6ft. Mixing Plant, T-34.
Hetherington-Berner Moto-Paver.
Barber-Greene Plant 848 Mixer. 836 Dryer Diesel.
Cummer 2500# Hot Mix Plant.
Monotrol complete plant. Three years old.

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Sauerman slack line 1¼ yd.; electric 90' mast.
Sauerman 1 yd. with 100 hp. electric motor, complete.
Sauerman 1 yd. with Wakesha gas hoist.

RICHARD P. WALSH CO.

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CONVEYORS — CONVEYOR PARTS — IDLERS BELTING — PULLEYS — VIBRATING SCREENS SCALES — CRUSHERS — SPEED REDUCERS

WRITE, WIRE OR PHONE. IMMEDIATE SHIPMENT FROM STOCK

NEW TROUGHING IDLER CONVEYOR BARGAINS

We take our loss on our stock of short length belting and previous model idlers. You save as much as 50% by buying the BONDED CONVEYOR SPECIALS listed with conveyor belting in two pieces. Belting is 4 ply, 28 oz. duck, ⅛" top rubber cover and 1/32" bottom cover.

Belt Width	Length of Conveyor	List Price	Sale Price
18"	25'	$1229	$ 658
18"	45'	1839	960
18"	50'	2054	1043
18"	85'	3209	1581
24"	25'	1322	739
24"	45'	2062	1085
24"	60'	2617	1355
24"	100'	4097	2037
30"	25'	1421	806
30"	65'	3101	1617
30"	80'	3731	2295

Other lengths and belt widths at bargain prices

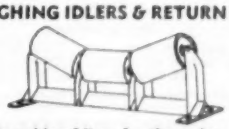
CONVEYOR BELTING

New heavy duty rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For boxes, bags, and bulk materials. Troughs easily.
Famous Brands at Deep Cut Prices. Fresh Stock.

Width	Ply	Top Cov.	Bottom Cov.	Duck Carcass	Price
18"	4	⅛"	1/32"	28 oz.	$2.50/ft.
24"	4	⅛"	1/32"	28 oz.	3.23/ft.
30"	4	⅛"	1/32"	28 oz.	3.97/ft.

Additional widths and plies available at low prices. Write for free sample.

TROUGHING IDLERS & RETURN ROLLS



3-roll Troughing Idlers for these sizes:

16" belt	$17.25	30" belt	$19.50
18" belt	18.00	36" belt	20.25
24" belt	18.75	48" belt	21.75

1-roll Return Idlers for these sizes:

16" belt	$6.75	30" belt	$8.25
18" belt	7.13	36" belt	8.75
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Rust proof ball races—maintenance is negligible.

HEAD AND TAKEUP PULLEYS

All welded steel head and tail pulleys and assemblies complete.
Priced from $55.00

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Bonded offers speed reducers for fractional to 60 H.P. motors in a variety of ratios.
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For sizing and separation of Rock, Sand, Gravel, Slag, Coal and many other uses. Shaft is mounted on self-aligning bearings and made in heavy duty eccentric shaft types; 1 to 5 decks, 3'x8' to 5'x14'.

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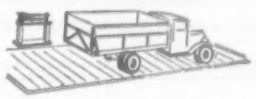
For stationary and portable applications. Scales have steel lever system complete with structural steel weighbridge. Capacities to 50 tons. Recording beams available.



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33 Ton Truck Scales 625.00

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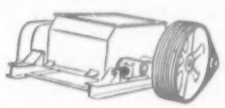

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All Types Idlers, Return Rolls and Belting in Stock

Headback	Head & Tail	Roll Idler	Self-Aligning Idler	Guide Idler	Wing Pulley
$90.00	$171.00	$6.38	$56.50	$13.75	$74.00

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Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders
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1—Brown Hoisting Machinery Co. 14 Ton, 40 foot boom, standard railroad gauge, steam powered, cast steel trucks. No bucket included. Located Georgia.

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BRUNSWICK, GA. PHONE 1610

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1¾ yd. Manitowoc 3000A diesel cranes, 65' bm. Cat. D13000 engine.
½ yd. Link Belt LS50 Backhoe-Crane.
30 ton Industrial Brownhoist Gas Locomotive Crane. 70' bm.
44 ton GE Diesel-Elec. Loco. new 1951.
25 ton GE Diesel-Elec. Loco. new 1950.
30 yd. Western & Koppel Air Dump Cars.
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1200 CFM Ing. Rand XRE, 200 HP Compr.
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Mississippi Valley Equipment Co.
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300KVA DIESEL AC GENERATOR

General Electric 440/60/3 powered by two Model 6DC 1125 Buda Diesel Engines, connected with Twin Disc clutches and multiple V belts. One Engine has electric starter and generator, the other has gasoline engine starter. This set complete with all controls and Panel Board.

75 KVA DIESEL AC GENERATOR

Westinghouse 440/60/3 direct connected to Model 6DC 844 Buda Diesel engine with electric starter and generator, and complete with all controls and Panel Board. This equipment may be inspected under full operation until about May 15th. Will be available after that date account of Public Utility connection to furnish power at quarry.

ONE DIAMOND 4'x8' THREE DECK SCREEN.

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All equipment listed in good working condition.

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1—Marion Model 92 All Electric Shovel, 3½ yd.

THE OHIO HYDRATE & SUPPLY CO.
Woodville, Ohio

1—9" x 15" Champion Jaw Crusher.
1—10" x 20" Champion Jaw Crusher.
1—Type 30 New Holland Impact Crusher.
1—Pair New Holland 16" x 16" Rolls (Lot spare shells & parts.)
2—New small Swing Hammer Mills, 5½" x 8" feed.
1—12" Enclosed Cent. Disc. Elevator, 78' centers with Motor. Heavy case.

We build open and totally enclosed bucket elevators and belt conveyors to suit your needs.

Large stock chain, sprockets, buckets and conveyor pulleys—new and used.

JOHNSON & HOEHLER, INC.
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1—16" Telsmith Gyratory Crusher.
1—14" x 26" Acme Jaw Crusher.
1—12 x 24 Buchannan Jaw Crusher.
1—18 x 30 Farrel Jaw Crusher Blake Type.
1—18 x 36 Farrel Jaw Crusher Blake Type.
1—15-40 Good Roads Ball Bearing Jaw Crusher.
1—10-30 Good Roads Ball Bearing Jaw Crusher.
1—9-21 Telsmith Ball Bearing Jaw Crusher.
1—10-20 Austin Western Ball Bearing Jaw Crusher.
1—18 x 30 Telsmith roll Crusher.
1—18 x 30 Cedar Rapids Roll Crusher.
1—#40 Telsmith Gyratory Reduction Crusher.
1—#32 Telsmith Gyratory Reduction Crusher.
1—6" Allis-Chalmers Reduction Crusher.
1—5'x12' Telsmith Double Deck Vibrator Screen.
1—3'x8' Telsmith Triple Deck Vibrator Screen.
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LONG year "UG" Straitline Core Drill. 36x25 Eagle Screw Classifier, Washers etc.

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SCREEN—4 x 8 Telsmith Pulsator 4 deck.

CRUSHER—15 x 40 Champion Roller Bearing Jaw Crusher.

BOOM—75' Dragline Boom for 80D Northwest with 2½ yd. perforated bucket and fairlead.

ENGINE UNIT — Murphy Diesel MD-6 complete 135 HP.

G. & W. H. CORSON, INC.
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6" x 3" to 60" x 48"

Before buying or selling any FARREL-BACON JAW CRUSHERS it will pay you to consult

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Engineers and Manufacturers
Machine Shop Facilities
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50-B Bucyrus-Erie Steam Shovel—Serial No. 4978.

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Switch Material and Track Accessories properly matched and fabricated to your exact requirements.

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WANTED—Secondary crusher, 30 to 40 ton.
Bin, 30 to 40 ton. 2 to 2½ yd. dragline.
Super C Tournapull with W-210 Wagon or comparable.
FOR SALE—Hough HM Payloader, 1½ to 2 yd. capacity. New Spring 1953.
P & H, 255 A, ¾ yd. Shovel, also available, hoe & crane boom.
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International 19 front end loader also 3 to 4 yd. earth mover.
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24" Hammermill with 40 HP, 220/60 cy., 3 phase motor with starter and V belt drive.
1951 Ford F8 truck tractor with power 5th wheel.
Grundler 24" x 5' reciprocating feeder.
35' x 18" portable conveyor. 24' x 24" conveyor.
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Shovel attachment for 150 P & H.

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90"x60' Christie indirect heat dryer.
Nos. 12, 10, 9, 8, 7½ and 6 Allis-Chalmers gyratory crushers.
222, 622, 636 & 236 Allis-C Hydrocone Crush.
6'x22" Hardinge ball mill.
1—42"x16", 36"x16", and 24"x12" crushing rolls.
1—Complete lime hydrating plant.
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5' x 50' x ½" dryer. 8' x 120' & 7' x 120' kiln.
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45 to 450 ton, steel.

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48" Symons, vert. disc.
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50" Raymond, 5 roll, high side.
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5—35'-70' cc., 12"x6" buckets, Cent.
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(Other Elevators from 20' to 50')

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8' x 125' x ¾".
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4'6" x 50' x ¼" with lifters.
5' x 67' x 5/16".
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18" x 65' centers, complete.
30" x 7'5" centers.

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6' x 8' Patterson, Pebble.
Size B, Abbe.
Raymond No. 402, Bowl.

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4' x 10' Seco, double deck.
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3—Bucket Elevators 35' to 42' centers 12" x 6" buckets, 5 HP drives.
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40x22 Austin-Western double roll crusher, roller bearing with two new plain roll shells—Ser. #402283. Like new, late model —$4500.00.

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20"x 36" Cedar Rapids Jaw Crusher, roller bearings. 36"x 8' Cedar Rapids Apron Feeder. Very good used condition—$6000.00.

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Crusher and Conveyor Division
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60-ton, 2-comp., 8'x18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belt.
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105 cu. ft. Schramm gas powered on 4 steel wheels.

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LOCOMOTIVES: 2—65 ton, diesel electric, standard gauge, 0-4-4-0, in guaranteed condition. For sale or rent.
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MINE HOIST SPECIAL: Nordberg 1200 H.P., 1400 FPM, one drum clutched, wraps 1100 ft. 1¾" rope, complete with motor and all auxiliary equipment.
CLASSIFIERS: 4—Akins 54"x 34 ft. with lifting device, 220/440 volt motors. 2—Wemco 78" Simplex single screw, double pitch, 28½ ft. tank, 220/440 volt motors. All in condition like NEW. 1—Wemco Duplex size 72"x32 ft., type SH, pitch double and variable, with lifting device, 220/440 volt motor. NEW and UNUSED. Three located Nevada.
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INDEX TO WHERE TO BUY

Acme Block & Supply Co. 192
Albert Pipe Supply Co., Inc. 192
Andersen Sand and Gravel Co. 197

Bacon-Pietsch Co., Inc. 194
Bandy, L. K., Contr. Co. 194
Blue Ball Machine Works 194
Bonded Scale and Machine Co. 193
Brill Equipment Company 195
Brunswick Marine Construction Corp. 194

Contractors Machinery Company 192
Corson, G. & W. H., Inc. 194

Davis and Walters 196
Dormer, E. J. 196
Dyer, W. H., Co., Inc. 196

Elmhurst Chicago Stone Co. 196
Equitable Equipment Co., Inc. 196

Fort Dodge Limestone Co. 197
Foster, L. B., Co. 194
Frank, M. K. 194

Gibsonburg Lime Products Co. 196
Greenbank Sand & Gravel Co. 194

Harder, Arthur J. 196
Hawkins & Company 197
Heat & Power Co., Inc. 195
Heidenreich, E. Lee, Jr. 196
Heineken, W. P., Inc. 194

Jaeger-Lembo Machine Corp. 191
Jennings, C. W. 196
Johnson & Hoehler, Inc. 194

LaGarde, John B., Inc. 197

McLeod, Alex T. 192
Mid-Continent Equipment Co., Inc. 194
Midwest Steel Corp. 192
Minnesota Constructors Equip. Co., Inc. 196
Mississippi Valley Equipment Co. 194

Neuheisel Lime Works, Inc. 192
New York Trap Rock Corp. 194
Nunn Company 196
Nussbaum, V. M., & Co. 196

Ocoya Stone Company 194
Ohio Hydrate & Supply Co. 194
O'Leary Bros. 196
Olson Equipment Company 195
O'Neill, A. J. 195

Pearl, F. J. 196
Pennsylvania Drilling Company 196
Power Equipment Company 195
Pratt Limestone Co. 196

Reading, Eugene P., Inc. 196
Rental Equipment Company 192

Sheridan-Marquette Welding Service 196
Smith, H. Y., Co. 196
Smith, L. B., Inc. 195
South River Sand Co. 192
Spicer Gravel Co. 196
Stanhope, R. C., Inc. 192
Sturm & Dillard Co. 196
Sunnyhill Coal Company 196

Tractor & Equipment Co. 196

Unverzagt, G. A., & Sons, Inc. 192

Walker Brothers Quarries 197
Walsh, Richard P., Co. 193
Whayne Supply Co. 197

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INDEX TO DISPLAY ADVERTISERS

Allis-Chalmers Mfg. Co. 15, 18, 20, 21, 111, Inside Back Cover
Allis-Chalmers, Tractor Division 30, 31, 129
American Brake Shoe Company
American Manganese Steel Div. 54
Electro-Alloys Division 48
American Chain & Cable Company 6
American Rubber Mfg. Co. 114
American Steel & Wire Division 28, 29

Babcock & Wilcox Company 8, 46
Baldwin-Lima-Hamilton Corp. 44
Barber-Greene Company 50, 51
Bemis Bro. Bag Company 4
Bergen Machine & Tool Co., Inc. 152, 185
Berg Vault Co. 132
Besser Mfg. Co. 148, 155, 156, 185, 188
Binney & Smith, Inc. 176
Blaw-Knox Company 138, 190
Bucyrus-Erie Company 49, 131
Builders Equipment Company 183
Burmeister, L., Co. 189

Caterpillar Tractor Co. 99, 100, 101, 102
Chain Belt Company 120
Chevrolet Motor Division 125
Chrysler Corporation, Industrial Engine Div. 115
Clark Equipment Company 112, 113
Cleveland Vibrator Company 176
Clipper Manufacturing Co. 147
Colorado Fuel & Iron Corp. 47, 126
Columbia-Geneva Steel Div. 28, 29
Columbia Machine Works 159
Columbian Carbon Company 176
Combustion Engineering, Inc. 19
Cook Bros. Equipment Company 160
Cross Engineering Company 134

Davis, Frank D., Company 178
Dodge Trucks 38
Dunn, W. E., Mfg. Co. 185
du Pont de Nemours, E. I., & Co., Inc. 25

Eagle Iron Works 43
Electro Dynamics Division of General Dynamics Corp. 135
Erickson Power Lift Trucks, Inc. 184
Euclid Division 58

Falk Corporation 52
Farrel-Bacon 136
Fleming Manufacturing Company 184
Ford Trucks 140
Frederick Iron & Steel, Inc. 140
Fuller Company 11

Gardner-Denver Company 109
General Dynamics Corporation 135
General Electric Company 106, 107
General Motors Corporation 58, 125
General Refractories Company 39
Gilson Screen Co. 198
Goodrich, B. F., Company 3
Goodyear Tire & Rubber Company Back Cover
Gulf Oil Corporation 9

Hammond Bag & Paper Company 142
Hardinge Company 139
Harnischfeger Corporation 56
Heil Company 118
Hendrick Manufacturing Co. 138
Hercules Powder Company 14

Iowa Manufacturing Company 23, 128

Jaeger Machine Company 127
Johnson, C. S., Co. 150, 151
Jones, J. A., Concrete Machinery 176

Kennedy-Van Saun Mfg. & Engineering Corp. 105
Kent Machine Co. 178
King Powder Co., Inc. 32
Koehring Company 150, 151

Le Roi Company 119
Lessmann Manufacturing Co. 141
LeTourneau-Westinghouse Company 10, 116, 117
Lima Shovels 44
Link-Belt Company 1, 139

Macwhyte Company 141
Manitowoc Engineering Corp. 22
Mapico Color Division 176
Marietta Concrete Corporation 157
Medusa Portland Cement Co. 154
Moore Dry Kiln Company 184
Morris Machine Works 122

Nagle Pumps, Inc. 130
Nordberg Mfg. Co. 33
Northwest Engineering Company 5

Oswalt Engineering Service Corp. 180

Pangborn Corporation 121
Pettibone Mulliken Corp. 24, 27
Pioneer Engineering Works, Inc. 36, 37

Quinn Wire & Iron Works 184

Raymond Division 19
Remington Arms Co. 25
Resisto-Loy Co. 140
Riddell, W. A., Corp. 183
Rockwell Spring & Axle Co. 34, 35
Roebling's, John A., Sons Corp. 47
Ryerson, Joseph T., & Son, Inc. 198

Sauerman Bros., Inc. 134
Schield Bantam Company 133
Screen Equipment Company, Inc. 123
Simplicity Engineering Company 136
Smidth, F. L., & Co. 40
Smith Engineering Works 12, 13
Smith, T. L., Company 179
Star Expansion Products Co. 188
Stoody Company 97
Stulz-Sickles Co. 130
Syntron Company 128

Tennessee Coal & Iron Div. 28, 29
Texas Company 62
Thew Shovel Co. 26
Timken-Detroit Axle Division 34, 35
Towmotor Corporation 177
Traylor Engineering & Mfg., Co. 7
Truax Machine Co. 182
Truck Mixer Mfg. Bureau 158

Union Wire Rope Corporation 16, 17
Unit Crane & Shovel Corporation 181
United States Steel Corp. 28, 29, 146
Universal Atlas Cement Company 146
Universal Engineering Corp. 24, 27

Vulcan Iron Works 137

Western Machinery Company 45
Wickwire Spencer Steel Division 126
Wilfley, A. R., & Sons, Inc. 140
Willard Concrete Machinery Sales Co. 180
Williams, C. K., & Co. 175
Williams Patent Crusher & Pulverizer Co. Inside Front Cover
Williams, Roger F. 184
Wood, Charles E., Company 132
Worthington Corporation 153

Yuba Manufacturing Co. 124, 128

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